

Sept 3, 1968

# OFFICE OF DIRECTOR - MSFC

| CODE          | NAME          | INIT. | <input type="checkbox"/> ACTION | <input type="checkbox"/> INFORMATION |
|---------------|---------------|-------|---------------------------------|--------------------------------------|
| DIR           | Dr. von Braun |       |                                 |                                      |
| NOTES<br>File |               |       |                                 |                                      |

## REMARKS

Regarding your note of 9-10-68 on replacement for Dr. James L. Milner, you stated, "I think we must help Ernst Geissler to find a replacement, freeze or no freeze. This area is vital." I am attaching a status report on personnel as of September 9. Our problem is that we now have 6,389 permanent employees on board compared to end of September target of 6,325. Hopefully, we will reach our target by the end of September, but it is unlikely. If attrition should, for any reason, be accelerated next quarter, we may have some room to maneuver.

H. Gorman  
Sept. 24, 1968



|      |      |      |
|------|------|------|
| CODE | NAME | DATE |
|------|------|------|



*Lerman Newby*  
*Huth*

# EMPLOYMENT OUTLOOK THRU SEPT

|       | <u>6440</u><br><u>PLAN</u> | <u>TARGET</u><br><u>EO</u><br><u>SEPT</u> | <u>ON</u><br><u>BOARD</u><br><u>9-9-68</u> | <u>OVER/</u><br><u>UNDER</u><br><u>TARGET</u> | <u>PENDING</u><br><u>CONVER-</u><br><u>SION TO</u><br><u>PERM</u> | <u>FIRM</u><br><u>COMMIT-</u><br><u>MENTS</u><br><u>THRU SEPT</u> | <u>ANTICIPATED</u><br><u>ATTRITION</u><br><u>THRU</u><br><u>SEPT</u> | <u>ACTUAL</u><br><u>ATTRITION</u><br><u>TO DATE</u><br><u>THIS FY</u> | <u>PROJECTED</u><br><u>OVER/UNDER</u><br><u>SEPT</u><br><u>TARGET</u> |
|-------|----------------------------|---|--|---|---|---|--|---|---|
| WB    | 863                        | 847                                       | 818  | -29   |   |   | -3   | 3   | -32   |
| TECH  | 850                        | 835                                       | 917  | +82   |   | (2)   | -2   | 7   | +80   |
| CLER  | 1043                       | 1024                                      | 1014                                       | -10   | +1  |   | -20  | 50  | -29   |
| BUS/P | 1031                       | 1013                                      | 1004                                       | -9  |   |   | -3   | 22  | -12   |
| NGR/3 | 2653                       | 2606                                      | 2636                                       | +30   |   | +5 (11)   | -12  | 32  | +23   |
| TOTAL | <u>6440</u>                | <u>6325</u>                               | <u>6389</u>                                | <u>+64</u>                                    | <u>+1</u>   | <u>+5 (13)</u>  | <u>-40</u>   | <u>114</u>  | <u>+30</u>  |

END OF 1<sup>ST</sup> QTR. FY-69

TARGET = 115 LESS

(25% of 459 REDUCTION)

RECEIVED DEP-A

1968 SEP 9 PM 3 19

## NON-PERMANENT STATUS

|        | <u>CEILING</u> | <u>ON-BOARD</u> |
|--------|----------------|-----------------|
| CO-OPS | 169            | 199             |
| YOC's  | 162            | 118             |
| SUMMER | 164            | 60              |
| TEMP's | 0              | 3               |
| TOTAL  | <u>495</u>     | <u>380</u>      |

BEYOND  
SEPT.

AVG 13.3  
PER WEEK  
FOR NEXT  
3 WEEKS

AVG 11.4  
PER WEEK  
DURING  
LAST 10  
WEEKS

OVER  
6325  
TARGET

B  
9/10

1. SNAP-27 Safety Meeting: A representative of our Aerospace Environment Division was invited to participate in the subject meeting at AEC Headquarters, Germantown, Maryland on August 22 and 23, 1968, to discuss the meteorological aspects of the dangers associated with transporting and handling the SNAP-27 fuel capsule. Representatives from DOD, AEC, ESSA, NASA, Air Force, Sandia and Boeing attended this interagency meeting. The actual responsibilities of the meteorological working group are as follows: a. To evaluate the atmospheric transport model of potential fuel releases as a result of launch and ascent aborts, reentry, and earth impact. Assess potential ground and air concentrations, resuspension, weathering, and short and long term doses; and identify location, area extent, and population involved. Scope includes application of source term information for potential accidents. Interface is with the Biomedical, Reentry and Range Safety SNAP-27 Working Groups. b. To document meteorological analysis in support of overall SNAP-27 risk evaluation to be presented in Panel Safety Evaluation Report. The next meeting is scheduled for September 11 through 13, 1968, at KSC. Representatives from Aerospace Environment Division will participate. The group plans extensive use of our data resources and study results. We are presently assisting NASA Headquarters and AEC personnel to make proper preparations for this meeting. ✓

2. Lateral/Longitudinal Coupling of AS-502: Your comment to our weekly note of August 12, 1968, on this subject suggested that we give credit to the individual who analyzed the coupling observed on AS-502. This was a team effort conducted through the Ad-Hoc Committee headed by Mr. Bob Ryan. The membership of this group was composed of leading engineers in several branches of our Dynamics and Flight Mechanics Division. The members involved were: Bob Lewis, Jim Papadopoulos, Harry Buchanan, Gaines Watts, Joe Howell, Keith Mowery, Larry Kiefling and Dr. Jim Milner. Support in conducting the simulation was provided by Northrop. A letter of commendation to this group is being drafted for your signature.

3. Dr. James L. Milner's Resignation: Dr. Jim Milner has recently resigned to accept a position in private industry. As you are aware, he has contributed tremendously to the work of analyzing the lateral/longitudinal coupling anomalies observed on AS-502. For the past three months he was located in PLVE Laboratory in order to provide better coordination of our efforts. Dr. Milner is leaving because of the promotion situation; not because of the technical challenge of his job. He has been a GS-13 for six years with no promise of acquiring a GS-14 because of the grade structure. The loss of Dr. Milner has a tremendous impact and a suitable replacement is a dire need.

E.F.

It seems that MSC is not challenging the validity of the findings of this group. Suggest we wait with a formal commendation letter until we are certain the analysis is correct.

Harry Buchanan

I think we must help  
Ernst Fetscher to find  
a replacement, Fred or  
or Jim Fetscher.

This area

is wide.

B



Berman

NOTES - 9/3/68 - BALCH

9/3/68

B  
2/10

MISSION:

S-IC-6 - Stage was removed from the B-2 Test Stand on 8/28/68 and was shipped to MAF on 8/29/68. ✓

S-IC-7 - Test stand refurbishment is underway in preparation for stage arrival, which is scheduled for 9/12/68. ✓

S-II-5 - Stage is scheduled for removal from the A-1 Test Stand on 9/6/68 and installation in the Vertical Checkout Building for modification by 9/9/68. ✓

S-II-6 - Stage contractor has released a new schedule for cryo proof test and static firing, previously scheduled for 9/5/68 and 9/13/68, respectively. Schedule is now 9/14/68 and 9/24/68, respectively. ✓

INSTALLATION:

GH<sub>2</sub> Storage Bottles - Modification to the GH<sub>2</sub> storage bottle for the S-II Complex has proved satisfactory thus far. Leak checks have been performed, and the bottle has been repressurized with GH<sub>2</sub>. Since KSC and other users of GH<sub>2</sub> have had problems with GH<sub>2</sub> storage vessels similar to ours, other centers should give serious consideration to modifying their GH<sub>2</sub> storage vessels in a similar manner. ✓ 2 1.0. Please pass this suggestion on to KSC

BOMEX - Mr. Philip N. Whittaker, Associate Administrator for Industry Affairs, apparently had been thoroughly briefed on BOMEX, as evidenced by the amount of time spent by him on this subject while visiting MTF on 8/28/68. A conference call between Mr. Whittaker and Mr. Frank Godsee, Consultant to Mr. Webb, occurred during the visit, the results of which were reported to General O'Connor. ✓

Operational Costs at MTF - We are proud of past activity in "scrubbing down" operational costs. ✓ Please note that MTF costs are heavily dependent upon Boeing and North American activities, schedule demands, etc., over which the Stage and Contracting Offices exert major control. If MTF is allowed more control and approval of the internal work schedule here, we could work out more cost savings this year and still meet KSC delivery dates. ✓ Ed O'C Please look into this B

MARL Project - The Mobile Acoustic Research Laboratory (MARL) has been moved from the A-1 Test Stand to the A-2 Test Stand field location in preparation for the static firing of S-II-6. This will be the second test conducted by MTF personnel as part of the R-P&VE Acoustic Research Program. ✓

J.B.  
Rightfully  
sol B

9/30/68

B 29/10

Bill Lucas

Could this  
provide a  
clue for the  
still-mysterious  
SLA anomaly  
we had in  
502?

B

MDA /AIRLOCK INTEGRATED STRUCTURAL TEST DELAY: Recently a Block I lower SLA failed in an IU loading test. This lower SLA had been scheduled to be used as a test fixture to support the Airlock module during the MDA /Airlock Integrated Structural Static Test. It will either be replaced with (1) a test fixture which will simulate the proposed 203 payload envelope cylindrical section; (2) another lower SLA now located at Wyle Labs, Huntsville; or (3) design and construct a simple single purpose test fixture. This could represent a 5 to 6 month delay in the start of the MDA /AM structural test program. Other alternatives are being investigated by R&DO.

CREW OPERATIONS BRIEFING: A Crew Operations Briefing is scheduled for September 12-13, and was requested by MSC to familiarize the crew with ATM operational aspects. A meeting of MSFC personnel was held August 30, to establish the agenda and contents of presentations for the briefing. ✓

CLEANROOM FUNDS (ATM): The QUAL and ME cleanrooms facility funds have still not been released by Headquarters. Headquarters reports that these should be released within two or three weeks. ✓

TRIP TO GRUMMAN TO REVIEW LM-A STATUS: In reply to your note on my Notes 8/26/68, I have made preliminary arrangements for your trip to GAEC in mid October to review the LM-A status. ✓

LM-A NEUTRAL BUOYANCY MOCKUP: A LM-A Neutral Buoyancy mockup has been constructed and is now being stored in ME Lab. Present plans are to use this mockup along with the updated ATM Neutral Buoyancy mockup when the cluster is assembled in the Neutral Buoyancy Tank in mid October. ✓

MSC ORGANIZATION CHANGES: Our MSFC representative at MSC recently informed us of John Hodge's Advanced Manned Mission Program Office organization. Its three offices are Lunar Exploration (Andre Meyer), Advanced Manned Missions (Rene Berglund - formerly AAP); and Program Engineering (Joe Loftus - formerly Apollo). The functions of this office are to perform systems analysis and manage detailed study efforts by MSC line organizations in advanced program definition. ✓



9/3/68

B 9/10

F-1 ENGINE - Reference my notes of 7-29-68 concerning the metal particles found in the LOX pump inlets of three engines on S-IC-3. Since the particle size did not exceed MSFC specification limits (maximum size 2500 microns), the decision was made to "use as is." ✓

Because recent MSFC analysis of AS-503 indicates a marginal condition at the spacecraft due to bending moment with one F-1 engine out, Rocketdyne was requested to submit an engineering change which will make the soft shutdown available for this vehicle. The ECP will not be approved until the updated vehicle dynamics study is completed (expected by September 4). However, since there is an eight week delivery on kits, an advance order for hardware for AS-503 has been authorized. This will permit installation of kits at KSC after rollout, but prior to CDDT. No impact on launch is expected. ✓

H-1 ENGINE - Reference my notes of 8/5/68 concerning the test results of the H-1 Engine SPGG Initiator by Franklin Institute. In light of these results, it has been decided to protect the installed initiator from radio frequency induced current by grounding the electrical harness shielding. This design change has been coordinated with KSC and approved by MSFC (Level III and Level II Configuration Control Boards). Kits are currently being installed at KSC on a noninterference basis. ✓

J-2 ENGINE - The approved D&F and Sole Source Procurement for the J-2 Production Support follow-on effort was transmitted from Headquarters on August 29. The D&F limits the period of performance to one and one-half years instead of the two and one-half years as requested. The transmittal letter recognizes the \$3 million of SRT funds in FY 69 for J-2 S development but prohibits the establishment of a firm J-2S Qual date at this time. This approval has taken Headquarters five months, leaving only three months to obtain the final proposal and evaluate, price, negotiate, etc. (The period of performance of the present contract ends December 31, 1968.) Obviously, many short cuts will be needed--elimination of prenegotiation conferences, expeditious pricing, expeditious contract review by legal, etc.--in order to prevent a program impact. In addition, careful surveillance by MSFC management will no doubt be needed both internally at MSFC and externally at Headquarters to keep this package from "bogging down." ✓

TERMINATION ACTIVITIES - As indicated in last week's notes, a TWX is being sent to General Phillips recommending partial termination of eight F-1 and three J-2 engines with estimated savings of \$4.0M in FY 69 and \$7.0M to \$8.0M in FY 70, less termination costs. We will still have sufficient engines in our inventory or in a refurbishable condition to meet Apollo program requirements through AS-515.

Although the number of spare engines have been reduced substantially, our latest F-1/J-2 spares usage experience seems to confirm that the cost savings are worth the added risk. ✓ Further, in a very urgent situation we can always use engines from a later vehicle to supply the needs of an earlier vehicle. ✓

7/3 JS

B 9/10

On Tuesday August 27, 1968, Mr. Philip N. Whittaker, newly appointed Assistant Administrator for Industry Affairs, NASA, visited the Michoud Assembly Facility. He was given orientation briefings by NASA, Boeing and Chrysler, followed by a tour of the facilities in New Orleans and the computer operations in Slidell. Mr. Whittaker appeared satisfied with his orientation of Michoud. ✓

B 9/10

9/3/68

1. SPACE CRANE: A working model of the "Space Crane" (another Serpentuator concept) was completed and demonstrated to interested personnel within R&DO. Dr. Johnson felt that the work was worthy of further pursuit and funded the effort with a modest amount of money (\$2K).

The final working model has been completed and is demonstrable within the Quality and Reliability Assurance Laboratory. Simulated zero "G" has been achieved with helium filled balloons. Powered by a central electric motor system, the six segmented device has two degrees of freedom at each joint. Salient features of this design are (a) high reliability through a simplification of aircraft control system cabling, (b) reduced weight along the moving members, (c) point accessibility within a cardioid of revolution, and (d) working models are immediately adaptable to neutral buoyancy test.

The Laboratory would like to extend to you an invitation to witness a demonstration of the operational capability of the "Space Crane" in our Lab.

Bonnie, set for 9/12/68 9 am. BLW  
Please arrange  
B

2. PRODUCT REPEATABILITY PROGRAM (BENCH TESTING): Results of the Product Repeatability Program clearly indicate that component failures are now being detected at the vendor's facility by the source representative and by the re-acceptance tests run at NR/SD, whereas a few months ago these failures were being found on the stage at Seal Beach, MTF, and KSC. ✓

9/3/68  
1. Goddard Space Flight Center Request. GSFC urgently requested ATM battery cells for their Orbiting Astronomical Observatory spacecraft which is scheduled to be launched in about one month. The ATM system uses the General Electric cells (Nickel-Cadmium, 20 Ampere Hour, Third Electrode) whereas OAO uses the Gulton cell. They were experiencing over-pressurization of the cells. We provided them with 112 cells which gives them a backup capability in the event they cannot solve the problem with the Gulton cells. GSFC will subsequently order GE cells to replace those we furnished to them. ✓

2. AS-503 Flight Control Computer. A discrepancy in the AS-503 flight control computer was discovered in checkout at KSC on Friday 30 August. The control system failed to respond to certain simulated input signals in the roll channel. The malfunction is not critical to flight, and preflight checkout can be accomplished without the particular simulated inputs. However, since the symptoms indicate the possibility of a malfunctioned relay which carries critical functions on other contacts, removal of the control computer from the Instrument Unit for further analysis is being considered. ✓

3. Precision Optical Tracking System (POTS). This system has been developed by personnel of Jim Taylor's Branch and it provides a more accurate and faster responding system during the initial phases of launching. The POTS was originally proposed as an inflight experiment but General Phillips was opposed to flying the experiment as part of the Apollo program. Only a passive corner reflector is required on the vehicle (IU) and data processing and computations are performed on the ground. All AAP core vehicles (except AAP 2) are planned to fly with POTS. The first three flights are to be considered as an experiment and POTS on subsequent flights would be considered operational equipment. Ground safety should be enhanced with this system. We are presently defining the ground computer requirements and the details of implementation. ✓



NOTES 9/3/68 HEIMBURG

9/3/68

B  
9/10

#### S-II STRUCTURAL TEST

The S-II Phase VB Structural Test was successfully conducted on 8/26. Test Phase VIA is scheduled for 9/5. R-ME worked this past weekend replacing cracked skin segment on the ring baffles in the LH<sub>2</sub> tank. ✓

#### ACCESS ARM NO. 9 - 1

Subsystem tests were completed on the Environmental Chamber 8/28. Boeing delivered the Control Console on 8/28, which was immediately installed. Hydraulic system was bled and first checkout swing test occurred on 8/30. During shut-down operations on 8/30, hydraulic fluid was found in pneumatic system of accumulator rack. Boeing worked during the weekend to prepare another accumulator rack which we are installing today. This is a repeat of the problem found with the 9-3 arm and will require relaxation of specifications and/or re-design by KSC. ✓

#### F-1 TURBOPUMP (POGO)

There was no test activity at the F-1 Turbopump Facility last week. We have been requested by P&VE to accumulate 3500 seconds, each, on an in-board and an out-board Arrowhead PVC Duct under F-1 Turbopump flow conditions. A meeting will be held this week with P&VE to define the test program and establish the delivery dates of the PVC ducts to Test Lab. ✓

#### S-II LH<sub>2</sub> TANK ENTRY TEST (MSFC)

The following information is in answer to your question on NOTES 8/26/68 HEIMBURG (Copy attached for Dr. von Braun and Mr. Weidner only).

KSC requested an S-II, LH<sub>2</sub> tank entry kit for access in the stacked condition for tank wall inspection, PU probe repairs, etc: KSC further required a demonstration/training entry be conducted by the KSC NAR technicians who would utilize this equipment if required on the launch pad. MSFC has set up the dynamic vehicle to support NAR effort. S-II Stage Office is coordinating this effort and R-TEST is only responsible for providing facility support as requested. ✓

NOTES 9-3-68 HOELZER

9/3 JS

B  
9/10

REDSTONE SCIENTIFIC INFORMATION CENTER (RSIC):

Due to yet unresolved budgetary restrictions placed on the Redstone Scientific Information Center, a reduction in the level of effort in the area of Alpha II (remote processing on the Third Generation UNIVAC 1108) is anticipated. This reduction will stretch out the implementation schedule of this advanced library management system. Current requirements will continue to be met on existing second generation equipment. ✓

9/3 JES

3  
9/10

1. C Prime Mission for AS-503:

Ludie Richard, Dr. Speer, representatives of R-P&VE, R-AERO, R-ASTR, and I attended a series of meetings with MSF, MSC, KSC and MSFC to firm up the C Prime Mission Definition. The following preplanned C Prime Mission options were approved by NASA management (Mueller, Phillips, James and Low), in a meeting at MSC on August 27, 1968:

- Translunar injection with S-IVB/IU-LTA-B (normal lunar guidance in launch vehicle, unmanned TLI).. ✓
- Translunar injection with CSM manned (normal lunar guidance in launch vehicle). CSM separation in first orbit (S-IVB TLI burn in second orbit). ✓
- Normal translunar injection guidance in launch vehicle with early S-IVB cutoff by crew command to obtain approximately 4,000 N.M. apogee orbit. ✓

In the latest meeting at MSC on August 28, 1968, agreements were reached and schedules established to make the C Prime Mission. ✓

MSFC will investigate the following additional mission options and report findings to MSC by September 6. (Ludie Richard action):

- Normal lunar guidance in launch vehicle with early guidance cutoff to obtain 4,000 N.M. apogee. ✓
- Normal lunar guidance in launch vehicle with early guidance cutoff to obtain 4,000 N.M. apogee with TLI ignition over Atlantic rather than Pacific. ✓

Mr. L. B. Bell (MSFC) and Mr. R. Rose (MSC) were established as the points of commitment for C Prime Mission activities. ✓

2. Flight Program Software Delivery:

KSC has requested that we look at the feasibility of delivering AS-503 flight program software on November 5 rather than November 11. This would permit the AS-503 FRT ahead of the CDDT, a possible time saver in overall operations. ✓

9/3/68

B 9/10

Supporting Development Programs FY '69 - On August 26, we were advised verbally of new, reduced guidelines for the FY '69 Supporting Development Program. For MSFC these new guidelines are:

904 -- Saturn/Apollo -- \$3M

905 -- AAP Support -- \$0

908 -- Advanced Manned Mission Support -- \$3M

The 904 funds are currently restricted for support of the J-2S Engine effort.

We were requested to review our original FY '69 Plan and to identify highest priority items in all three program lines. We advised Headquarters by TWX on August 27 of those items, other than J-2S, considered critical which we would like to continue. Funding required to complete these efforts is estimated at about \$4.6M; approximately 50 percent above guideline.

OART FY '69 Programs - On August 27, we were advised that Dr. Beggs had completed his review of the OART Programs and was issuing comments and guidelines.. These guidelines are in a more generalized form than in prior years; i. e. , they will be at the subprogram level rather than at the individual task level.

We were advised that the guidance to be provided by OART must be considered an interim operating plan. It does not reflect completely modifications which might occur as a result of the \$6M over-all budget reduction.



NOTES 9-3-68 KUERS

9/3/68

B  
5/10

1. RIFT Tank: Modification and spray foam insulation of the Lockheed built RIFT tank were completed last week. This tank will be shipped this week to General Dynamics, Fort Worth, for flow testing of valves for nuclear ground test stage studies. ✓
2. Contingency Payload for SA-503: All four new ballast containers were completed and installed into the BP-30 Service Module last week as scheduled. Shipment to KSC by the Guppy will take place this week. ✓
3. S-II Minitank: The ring baffles in the upper part (S-IC part) of the LH<sub>2</sub> tank have developed sizable cracks during testing. We have worked Saturday and Sunday with 20 people to build and install replacement parts for the damaged ring baffle sections. ✓
4. Neutral Buoyancy Simulator: Testing was continued on sealing the aft dome penetrations in the OWS. Subsequent to the 'initial test run, it was determined that additional handholds and tether points were required. ✓
5. Review of Chemical Milling at Grumman: A follow-up review was made of the chem mill operations of the Grumman Aircraft Engineering Company. Improvements of workmanship since our last visit in February were noted; however, it appeared that more attention to the rinse operation would be beneficial since residual salts were noted between faying surfaces of sub-assemblies and on some parts. Grumman management personnel were advised of the problem and actions are underway to resolve it. ✓

B5/10

9/3/68

1. S-IC-6 BAFFLE DAMAGE: (Reference Notes 8-26-68 Lucas) The baffle on S-IC-3 was of .040 thickness as S-IC-1 and S-IC-2. This baffle did not break. It had some dents and minor cracks only. The cracks were stop drilled and on one crack a doubler was added. ✓
2. POGO WORKING GROUP: The management review to General Phillips has been postponed to 9 a.m. 9-11-68 in the Boeing TIE LDX facility. The helium shutoff valves used in the POGO system (Flodyne and the backup Calmec) are now fully qualified. ✓
3. "C" STRUCTURAL TESTING: North American Rockwell (NR) states that it will take approximately 31 weeks to replace the "C" structure to the "as was" condition and a battleship fix would require about 4 weeks. Both proposals are distasteful. We are considering the proposal and alternatives. NR will submit a letter of recommendations for the "C" structure.
4. S-II STAGE GSE: On AS-502 we encountered difficulties holding the "Redline" fuel inlet temperatures. To improve this situation potential heatleak sources were insulated. One other improvement is to assure the lowest possible vacuum in the feed and recirculation line jackets. North American Rockwell (NR) proposed to add some new portable vacuum purge equipment at a price of approximately 1.4 million dollars including design, manufacture and testing. We reviewed their proposal and our GSE organization made an alternate proposal to modify existing GSE hardware to meet the vacuum jacketed line maintenance requirements. The new NR submission based on our proposal is technically acceptable and is approximately 1 million dollars cheaper. ✓
5. MSFC-SPEC-101 FLAMMABILITY REQUIREMENTS AND TEST PROCEDURES: MSFC-SPEC-101, Flammability Requirements and Test Procedures for Materials in Gaseous Oxygen Environments, depicting MSFC flammability requirements, has been coordinated and approved by all R&DO laboratories and has been signed by R-DIR. ✓
6. S-IC STRESS CORROSION PROBLEMS: The S-IC stress corrosion survey was reported complete by The Boeing Company (TBC) in August 1967. Since April 1967, we have experienced over 15 stress corrosion failures on the S-IC stage of components not reported by TBC survey. This record indicates clearly the incompleteness of TBC survey. We have asked that TBC be directed to repeat the survey and do it as thoroughly as originally requested, since failures of unreported hardware already have caused launch delays and additional work at KSC. ✓
7. S-II BATTLESHIP: The Battleship was fired for 106 seconds on 8-27-68. Preliminary data indicates no adverse effect on stage performance due to the removal of the lox sump antivortex baffles. NR is currently negotiating with Rocketdyne to make the next firing, scheduled on 9-4-68, a true lox depletion cutoff test, i.e., lox thrust OK pressure switch cutoff. ✓
8. MISCELLANEOUS: Mr. J. L. Vaniman of Fluid and Thermal Systems Branch presented an invited paper at the XIV Cryogenic Engineering Conference last week at the Case Western Reserve University, Cleveland, Ohio. The paper was entitled "Slush Subcooled Propellants for Lunar and Interplanetary Missions," and was co-authored with Mr. A. L. Worlund and Mr. T. W. Winstead. According to an independent source, the paper generated much interest within the audience. ✓

B.L.  
I don't  
understand  
this. Please  
furnish a little  
more background  
NOTES at  
sep. sheet  
paper



9/3/68

UAH SEPARATION STUDY:

On August 28, Ray Crouch and Jerry Fox with Col. Mohlere, presented the results of the study on separation of UAH from the University of Alabama to General Eifler. Gen. Eifler agrees that it is not in the best of interests of the community, the University, or the students to pursue separation at this time in view of the unfavorable academic and financial considerations. He does feel, however, that MICOM and MSFC should do everything possible to help UAH gain more recognition by the main campus and the Board of Directors, and that we should keep an open mind on the separation question as the academic and financial situations improve in the years ahead.

Gen. Eifler wanted you to be aware of a move headed by Mr. M.B. Spragins, Sr. for more recognition and autonomy for UAH. The General indicated that the Spragins' group plans to go directly to the Board of Trustees of the University without consulting Dr. Rose. We wonder whether Mr. Spragins is completely aware of the degree of independence already enjoyed by UAH and the steps which have been taken toward separate accreditation.

Gen. Eifler expressed his appreciation to you for bringing him in on the separation question and also reiterated his desire for MSFC and MICOM to continue the practice of exchanging information on matters of mutual interest.

FY-70 BUDGET:

We have received word from sources in both MSF and NASA Headquarters that BOB's first response on the FY-70 budget indicates a level near \$3.4B. It was also indicated that the resources appropriated in FY-69 but withheld from expenditure due to the expenditure limitation would be available in FY-70. If this is the case, total available funding would approach \$3.6B in FY-70 as contrasted to \$3.85B in FY-69.

NOTES 9-3-68 MURPHY

9/3/68

R 9/10

LLTV Accident:

A fuel tank in the Lunar Landing Training Vehicle (LLTV) burst during testing at MSC last week. Three people from Bell were slightly injured; however, according to verbal reports from MSC, they were most fortunate that these people were not seriously injured. The cause appears to have been a neglect of standard procedures, in that the normal pressurization cart was not used to pressurize the tank. A different cart with wrong pressure regulators was used (0-1500 instead of 0-50). Due to gauge inaccuracies, pressure sensor problems, and the high pressure supplied by the wrong cart, the tank burst. ✓

We will receive a copy of the formal report as soon as it is available and will disseminate this information to all organizations concerned. I am sure we can learn a lesson from this mishap. ✓



NOTES 9/3/68 RICHARD

B 9/10

9/3 JTS

Crew Safety Review Board: The AS-503 Crew Safety Review Board has met twice to date. The first meeting was an organization meeting followed by a review at KSC. The activity of the Board is hampered by the demand on the Chairman's time (Bill Schneider) by other high priority issues and the scheduled review of details which are significantly changed by the C' mission decision. The next meeting, scheduled for September 5 and 6 at MSFC, will probably be postponed because of the Mission Rule Review and your 205 FRR scheduled for September 6. While it is a little early to state that MSFC is going to satisfy this Board easily, we do not foresee any show stoppers. A copy of this Center's review agenda is being sent under separate cover, and we will keep you informed of progress. ✓

NOTES 9/3/68 SPEER

13 9/10

Lunar Landing Mission: As a result of the lunar landing mission review at MSC (attended by L. James, L. Richard, F. Speer), we have received late last week from Gen. Phillips a package with important changes in the lunar landing mission plan. You are requested to submit any MSFC comments by 9/6 in order to prepare for discussion in Management Council Meeting (9/10). I am coordinating inputs from all Center elements concerned and will prepare a draft of your answer. Here is a summary of the changes in the new plan (proposed by MSC and tentatively accepted by Gen. Phillips):

|                                    | Old         | New         |             |
|------------------------------------|-------------|-------------|-------------|
|                                    | 1st landing | 1st landing | 2nd landing |
| Number of EVA                      | 2           | 1           | 2           |
| Duration of EVA (hr)               | 2 & 3       | 2           | 3 & 3       |
| Number of Astronauts participating | 2           | 1           | 2           |
| Max. Planned lunar stay time (hr)  | 26          | 20          | 27          |
| Deploy ALSEP                       | yes         | no          | yes         |
| Erect S-band Antenna               | yes         | no          | yes         |
| Lunar Geology Investigation        | yes         | no*         | yes         |

\*soil sample retained

The rationale for the change centers around simplicity and safety and it is noted that crew training requirements are reduced, crew rest cycle improved, and LM descent performance margin improved. I do not foresee major objections from our side; however, the scientific return from the 1st landing will be significantly reduced.

✓

NOTES 9-2-68 Stuhlinger

B  
5/10

9/3/75

1. SPACE ELECTRIC POWER: Charles Donlan, Deputy Associate Administrator for Manned Space Flight, has summarized the OMSF position to Bill Woodward of OART on nuclear power systems for advanced manned mission requirements. In summary, the position is:

1. Improve the technology of solar cell/battery subsystems for multi-purpose workshop applications.

2. Continue isotope-dynamic subsystem technology development toward a ground test of a complete system in 1972-73 as a basis for a flight qualification of a system by 1975. The power level may be from 5 kwe to 15 kwe in single or multiple units.

3. Carry forward the technology of reactor-dynamic and reactor-thermionic systems providing up to 50-100 kwe. Target date for these systems should be in the late 1970's. ✓

2. GAMMA RAY EXPERIMENT: Our next balloon flight with a gamma ray experiment from Dr. Gibbons, ORNL, is scheduled for October 7. It will not be stabilized and therefore we can get by with a  $6 \times 10^6$  cu. ft. balloon. Anything much bigger in this period of austerity is quite difficult to obtain. Mr. Eaton, OSSA, Physics and Astronomy Directorate, has approved our flight and will supply the balloon. ✓

3. DEMONSTRATION OF SIMULATED LUNAR SURFACE ACTIVITIES:

Upon request of General Phillips, I attended a MSC demonstration of instrument deployment during EVA I and EVA II on the lunar surface by two astronauts. Both astronauts were out at the same time; they frequently worked together to achieve prescribed tasks. LM egress and ingress were not demonstrated. Obviously, many of the motions and manipulations caused great physical strain; the situation may be different under reduced lunar gravity. ✓

SA-205 STATUS: A spacecraft switch problem, that we understand has now been adequately corrected, caused some loss of test schedule time last week on the AS-205 testing. The spacecraft/launch vehicle electrical mate which was scheduled for Wednesday, August 28, was completed on Friday, August 30. Most of this time has been made up however and I do not believe it will affect the final flight schedule. The Overall Test Plugs In was completed Saturday evening at 7:30 PM with no significant problems in either the launch vehicle or the spacecraft. The Plugs Out is scheduled for Wednesday, September 4, with T-O at 2:00 PM. Based on completing the Plugs Out on time, the CDDT (wet and dry) is still scheduled for September 11 through September 16. ✓

SA-205 PREFLIGHT REVIEW: The review for your appointed Review Board is scheduled for Friday, September 6, in the LIEF Room. We plan to start at 8:00 AM and complete by 6:00 PM. In view of the relative few open items on the launch vehicle and the progress made during the two day Program Manager's PFR, we have changed the schedule for your PFR to one long day as indicated above. ✓

SA-213 THROUGH SA-216 ACTIONS: One of the primary activities of many of our Saturn IB and Contract Office personnel this last week has been effort to properly terminate the SA-215 and SA-216 S-IB Stage and S-IVB Stage long leadtime contracts and to plan the production of SA-213 and SA-214 at the optimum time considering the shortage of FY-69 and FY-70 funds. We have taken initial actions to terminate production on all SA-215 and SA-216 S-IB and S-IVB long leadtime hardware. We are following this up to assure that our termination actions are those which are most advantageous to the government. In some cases it was better to allow contracts to run out through the month of September so that the government was not liable for termination costs. We are also making maximum use of that hardware that has been built for 215 and 216 for spares where they are needed. ✓

Although the S-IVB and IU production for SA-213 and SA-214 is planned to follow SA-515 production, there is a requirement for considerable funds in FY-69 and FY-70. In view of this some of the Headquarters offices have started pushing for the use of our Saturn IB and Saturn V spare platforms, LVDC's, and LVDA's for these vehicles. At this time, we only have two spare platforms to support the program thru 212 and 515, and we have to produce an additional LVDC and LVDA to have one spare to support the program thru 212 and 515. This means that we will have to produce an additional two platforms and two LVDA's and LVDC's for SA-213 and 214. In areas such as these I feel we must consider the entire Saturn IB and Saturn V Programs before cutting ourselves too short on launch vehicle spares, where it has a possibility of causing a critical spares shortage that could end up costing us a complete launch vehicle late in the program or a great delay in a critical mission. ✓



SPECIAL NOTES 9/3/68 TEIR

9/3/68

(Distribution: Dr. von Braun, Mr. Neubert, and Gen. O'Connor)

In preparation for the SA-205 PFR, I would like to take advantage of the Weekly Notes to write this brief Special Note and bring you up-to-date on the principal actions of the two day Program Manager's Preflight Review conducted last week.

We found no new outstanding problems or actions as a result of the PMPFR and no open items that could not be closed out prior to the Flight Readiness Review or launch. There were some problem areas that require action and are being given priority action to close out prior to your review if possible. ✓

S-IB STAGE:

a. The failure analysis of a range safety system decoder is being expedited to assure that we do not end up with a late range safety system problem. ✓

b. S-IB Stage Office, R&DO and CCSD are reassessing the necessity to replace S-IB Stage auxiliary hydraulic motors that are now approaching life cycle limits. This is not critical since it is a motor change only. ✓

S-IVB STAGE:

a. Information provided by P&VE at this review generally substantiated the requirement for a small amount of additional silicone insulation in the area of the LH<sub>2</sub> tank non-propulsive vents. Should the venting hydrogen become ignited it would increase the temperature of the S-IVB forward skirt sufficiently to reduce the material's strength and affect the safety factor.

b. Because of susceptibility to stress corrosion, P&VE has proposed the change out of all S-IVB interface bolts. This is being reviewed in considerably more detail this week to determine whether it is a requirement to change out all interface bolts for all Saturn IB and Saturn V stages. ✓

INSTRUMENT UNIT:

a. The Review Board found that the IU structure has now been determined to be completely adequate for SA-205 flight. There are two open LVDC memory problems which require closeout action for 205 even though they did not occur on the LVDC now in 205. These will be discussed on Friday. There are no other open hardware problems on IU-205. ✓

NOTES 9-3-68 WILLIAMS

9/3/68

B2/10

1. Space Lab: Headquarters-ML visited us on August 29, 1968, to discuss potential work on on-board checkout and information management studies for the Space Lab. Fred Digesu served as host for this group, and the entire day was spent presenting our ideas for work in these areas. The meeting was held in Astrionics and presentations were made by Digesu (R-ASTR-A), Brooks Moore (R-ASTR-N), Walt Frost (R-ASTR-IT), and Bob Smith (R-QUAL-F). Afterward, Headquarters personnel were taken on a tour of Astrionics and Quality Laboratory facilities related to these work areas. ✓
2. Unmanned Planetary Program: Cecil Messer attended the final Planetary Working Group meeting at Headquarters to review the Program Memorandum draft for final presentation to the PSG. The "favorite" plan by consensus was an option with a \$350M level funding with Mars emphasis. No manpower requirements for MSFC were identified in this program. ✓
3. Nuclear Program: Ron Harris has been in close contact with Milt Klein following Milt's presentation to Webb on the Nuclear Program. We have been advised that the details are sensitive and we will provide them under separate letter. ✓

Sept. 9, 1968

NOTES  
MR. GORMAN'S COPY

SEP 9 1968

*With comments  
(none for DEPA)*

RECEIVED DEP-A

1968 SEP 25 PM 3 01



NOTES 9/9/68 BALCH

9/9 J/S

B.  
9/14

MISSION:

S-II-5 - Stage was removed from the A-1 Test Stand and installed in the Vertical Checkout Building on 9/6/68, where thrust structure and instrumentation mods are to be incorporated. Reinstallation of stage in the A-1 Test Stand is planned for 10/3/68. ✓

S-II-6 - Cryogenic proof pressure test has been rescheduled from 9/14/68 to 9/17/68 because of requirement to install open-loop Propellant Utilization system (in support of 503 launch), and a modification to the pneumatic servicing console. Static firing is scheduled for October 1, but is dependent on receiving of new prevalves which are required to be installed prior to firing. ✓

S-IC-7 - Arrival of stage at MTF is still scheduled for 9/12/68, and installation in test stand is planned the following day. ✓

INSTALLATION:

Helium Storage - Arrangements have been made for consignment to MTF of 8 helium rail cars at no cost to provide additional helium storage capacity. Six of these cars have been received, and the remaining 2 are scheduled to arrive today. These rail cars will increase our helium storage capacity by 1,920,000 Standard Cubic Feet and will make possible an estimated \$90,000 annual savings in rail car detention charges. ✓

Supply Procurement - Military Standard Requisitioning and Issue Procedure (MILSTRIP) has been implemented at MTF, and items are currently being requisitioned from various defense supply agency centers. ✓

Navy Activity at MTF - Mr. Richard Holten of the Navy Oceanographic Office has completed the required test on his computer software programs on the SDS-930 complex. Additional formatting and updating will be accomplished by local programmers. ✓

GENERAL:

Visit by NASA Headquarters Team - A Computer Utilization Team from NASA Headquarters was at MTF this past week. The team was interested in the workload generated by MTF for the Slidell Computer Center as well as the use of the data processing equipment located at MTF. ✓

9/9/68

B 9/14

EXTENSION OF CURRENT LM-A CONTRACT: Dr. Gilruth received a TWX from General Bogart dated August 26, authorizing the extension of the current LM-A contract through October 16, rather than September 30, an action made possible by reducing the maximum manpower level at Grumman from 500 to 400. MSC is preparing a TWX to Headquarters in advance of their procurement plan, requesting permission to negotiate a letter contract with Grumman to cover the period from October 16, 1968 through the end of June 1969. ✓

NONMETALLIC MATERIALS: MSC has issued a program directive which establishes MSC specification DNA-002 as the controlling document for selection of nonmetallic materials on AAP. An early meeting is planned between Headquarters and the Centers to discuss the reservations we had expressed prior to the issuance of a directive implementing the MSC document. ✓

EUROPEAN SPACE RESEARCH ORGANIZATION (ESRO) PRESENTATION: A presentation was given to Messrs. Warnke and Boksenberg of England and Mr. Collet of France, who represented the European Space Research Organization, on September 4, 1968. The presentation included briefings on the AAP Cluster I Program and advanced planning with a tour of the Saturn I Workshop mockup area and neutral buoyancy facilities. Dr. W. L. Haberman of OMSF accompanied the visitors. ✓  
H-1 ENGINE FOR "FAT" ATLAS: On Friday, September 6, I received a call from Ed Jonash of LeRC regarding excess H-1 engines. They are interested in H-1's for the "Fat" Atlas. I outlined the general situation regarding termination after vehicle 214, and that engines have been built that are not required through 214. I referred him to Bill Brown as the responsible MSFC contact. ✓

GENERAL: In review of forthcoming meetings, there is a conflict on November 5 (Tuesday) between the Management Council (if held on schedule) and the Presidential Election. It may be in order to suggest that travel be held to a minimum on this date to allow people to vote. ✓

Shed  
Good  
suggestion,  
Please propose to MSF  
to move Management Council date.  
B



9/9/68

B 9/14

F-1 ENGINE - At RETS, engine F-109-2 has accumulated 1497 seconds in 11 tests while performing resonance search and flow tests on the AS-503 flex line verification program. A resonance was detected in the heat exchanger helium outlet lines. Testing is progressing satisfactorily and on schedule.

Action to reallocate the oldest available F-1 spare engines into S-IC-11 is being coordinated with the S-IC Stage Office. This action will minimize the probability of major engine overhaul because of overage soft goods. Based on the integrated launch schedule with the two year launch gap between AS-511 and 512, three F-1 spare engines would have exceeded the current soft goods specification limit of 6 years installed life. It may be necessary for Boeing to do "out of sequence" work on S-IC-11 for approximately a month while these engines are updated and made available; however, the net cost savings available by avoiding these major overhaul costs appear sufficient to justify the action. ✓

J-2 ENGINE - As you may recall in the PFR, the tentative decision was made to retrofit the start tank fill line on Vehicle 205 and concurrently to rework the Douglas field procedure for the start bottle to a much slower initial fill. These changes would be considered for 205 only on a non-impact basis which during the meeting seemed doubtful. After further consideration, inasmuch as ordnance has already been installed on the vehicle, changing out the line appears to be an unreasonable risk because some in place welding is required. A failure of this line under the worst conditions would result in a launch abort as opposed to a mission loss or loss of life. In view of the total lack of failure history of this line in the J-2 engine program, with the exception of the flow tests which were conducted recently on a component level, it was felt by the IB and EPO offices that this would be a reasonable risk to assume. It is therefore concluded this change could not be put in a mandatory category. ✓

The S-II Battleship was fired September 4 for 361 seconds of main-stage operation. The programmed mode of engine shutdown was LOX depletion. An outboard engine was shut down by a signal from the mainstage OK pressure switch which triggered the shutdown of the other four engines. There were no observed anomalies or hardware damage. ✓

NOTES-CONSTAN-9/9/68

B 9/14

Visits to MAF

A special committee composed of representatives from NASA Headquarters, Executive Staff, Industrial Operations and Computation Laboratory visited MAF September 5 and 6 for the purpose of developing a plan regarding the future of Slidell Computer Facility.

Mr. Mahmoud Banna, Director General of Internal Security, Lebanon, visited MAF September 6, 1968, for a briefing and a tour of the facility. ✓

NOTES 9/9/68 GEISSLER

B 9/19

No significant items this week.

9/9 K/S

9/9 XBS

B  
9/14

1. IU STRUCTURE: As I previously mentioned in my NOTES of 8-19-68, personnel of this Laboratory have been conducting an analysis of AS-205 and AS-503 IU structures at KSC to assure honeycomb core to skin bonding is flight-worthy. Eddy-sonic and ultrasonic through-transmission tests failed to verify previous indications of non-bonding on IU 205 except in the case of a 1" diameter area which was determined to be a "blind" insert. The IU is thus considered structurally flightworthy. Previous non-bond indications were attributed to stresses (or differential stresses) in the honeycomb structure which were apparently relieved by removal of the alignment guide near the ST-124 and the absence of cold plate operation. Tests conducted by NAR Tulsa at KSC with an IU skin segment reasonably confirmed the relationship of stresses to false non-bond indications. Tests on IU 503 verified all but one previously detected non-bond areas, which was attributed to a stress induced false reading. Two areas were determined to be "blind" inserts and two were classified by R-P&VE as too small to require repair. The remaining two areas are to be repaired subject to X-ray confirmation that their location is not adjacent to a splice line. ✓
2. IU PROGRAM: IBM has recently completed the surveys of all vendors of Criticality I and II hardware as originally scheduled in their Quality Maintenance Implementation Plan. ✓
3. QUALITY PROGRAM REDUCTIONS: In response to a NASA Headquarters request for cost reductions, NR/SD proposed an \$11M reduction in the Q&RA area. This Laboratory reviewed their proposal and has submitted to the I-V-SII Office our assessment that a \$3M reduction can be made without prohibitive adverse effects to Q&RA requirements. ✓

9/9/68

1. Balancing Gyro Rotors. Our gyro lab has developed a laser gyro rotor balancing system which is in an experimental state to balance the gyro rotor at synchronous speed. Past balancing systems required measuring the unbalance and stopping of the rotation before removing the unbalance mass. The new system permits measurement of the rotor unbalance and removal of the unbalance mass by laser energy while the rotor is operating at synchronous speed. ✓

2. ATM Solar Cells. To date, 770 ATM solar cell modules have been delivered by the two vendors out of the contracted total of 860. Acceptance testing by MSFC has been completed on 720 modules. Delivery of the remaining quantity will be completed in November 1968. These modules are being stored in environmentally controlled trailers by ME and ASTR and we are investigating revising the shelf life currently specified as three years. ✓

3. ATM Solar Array Deployment Test. To "work around" a number of facility problems, we have decided to detach the ATM solar wings from the ATM rack for deployment demonstration testing at MSFC and at KSC. This will avoid the need for expensive handling fixtures, additional cranes and additional floor space at the two sites for which there is no money. To deploy the wings while attached to the rack would require the ATM payload to be rotated on its four sides sequentially. We will now do the test detached, using relatively simple supporting stanchions duplicating the mechanical and electrical interfaces of the wing and rack. Means have been identified which will assure valid system testing of the payload in its flight configuration (wings attached) in all other areas such as cabling continuity, squib activation and deployment actuator electrical verification. ✓

B 9/14

NOTES 9/9/68 HEIMBURG  
9/9/68

S-II STRUCTURAL TEST PROGRAM

The S-II (V7-21) stage structural test, Phase VIA, was successfully accomplished on 9/5/68. Test, Phase VIB, is scheduled for 9/12/68. ✓

ACCESS ARM NO. 9-1

Bleed operations on replacement hydraulic accumulator (Reference NOTES 9/3/68 HEIMBURG) were completed on 9/4/68, and arm swing tests were begun on 9/5/68. During shut-down operations on 9/5/68, hydraulic fluid was again found on pneumatic side of accumulator rack. Source of hydraulic fluid was traced to one of the four hydraulic accumulator bottles. This bottle was isolated from the system and testing continued using remaining three accumulator bottles. Boeing is pursuing this problem with manufacturer. System test should begin the latter part of this week. ✓

F-1 TURBOPUMP (POGO)

Met with P&VE on PVC test program (Reference NOTES 9/3/68 HEIMBURG). PVC ducts will not be available to Test Lab until the first part of October. Two POGO tests are scheduled on 9/12, using upstream lox pulser with turbopump running at low lox pump inlet pressures. ✓

MOBILITY TEST ARTICLES

Tests were run on the Bendix vehicle on 9/4/68, to calibrate the torque measurements. Several runs were made forward and in reverse; the vehicle was then accelerated (at full acceleration) to maximum speed and then braked. ✓



NOTES 9-9-68 HOELZER

9/9/68

B  
2/14

NEGATIVE REPORT.

9/9/68

B  
2/14

1. S-II Battleship: The battleship static test, a full duration run to accumulate additional data for evaluation of deletion of LOX sump baffles and LOX starvation cutoff, was successfully completed on September 4, 1968. Evaluation of data is in process. Two more short duration firings are scheduled before the battleship program is terminated for cost reduction. ✓
2. S-II Battery Failure: NR and MSFC representatives conferred on August 24 and 25, 1968, at NR/Seal Beach to determine corrective action required after the August 15, 1968, Eagle Picher battery failure which occurred during the Quality Maintenance Tests of the S-II-3 (and subsequent) batteries. The battery failure was attributed to battery mounting. The need for a modification on S-II-3 and subs is presently being investigated with R&DO. NR/SD is conducting battery shock mounting tests scheduled to be completed September 11, 1968. Qual verification tests on four batteries will start on September 16, 1968, with completion on September 25, 1968. A battery shock mount mod kit is available at NR/SD Seal Beach for S-II-3 and can be installed with about 100 manhours. ✓
3. C' Mission: The C' mission change will result in several hardware changes in addition to the flight tapes. The lead time is short for defining and implementing the changes is a schedule impact is to be avoided. Planning sessions are being scheduled between systems engineering, the affected laboratories, the project offices and change boards to accelerate the change process. ✓
4. AS-503 Flight Program Tape: We (R&DO and IO) agreed to support an earlier (November 5 instead of November 11) flight program tape delivery for AS-503 as a planning date pending further analysis by KSC whether the FRT is to be scheduled ahead of CDDT (see Notes 9-3-68). The November 5 delivery will not be a completely verified tape. KSC has agreed to accept operating restrictions - to be firmly defined in meetings on September 9 and 10 - for the tape usage. Final verification cannot be promised by MSFC before November 11. ✓

9/9/68

B  
9/14

For a number of years the Research Programs Office has had the responsibility for the coordination within the Center of unsolicited proposals. This is within the Center the counterpart of a responsibility carried for the agency by the Office of University Affairs. There are three principal functions involved:

1. Recording and acknowledging receipt of the proposal.
2. Evaluating the proposal.
3. Acting upon and recording and acknowledging the action on the proposal.

For several years we have been concerned that because of the relationship between the Center and (potential) contractors inherent in the unsolicited proposal, the responsibility was misplaced in the Center. P&C has always played a major role in carrying out the principal functions listed. Therefore, early this year an agreement was reached between R-EO and P&C, transferring primary responsibility from the Research Programs Office to P&C; with R-EO providing programmatic and evaluation support as required. ✓

With the appointment of Mr. Mohlere as Assistant Director for University Affairs, final responsibility, within the Center, for handling unsolicited proposals is vested in him, as a part of the relationship between the Center and the Office of University Affairs. It is anticipated that, in consonance with the agreement previously reached between R-EO and P&C, P&C will serve as the principal element within the Center supporting him in handling unsolicited proposals; including the exercise of all formal contacts between the Center and the proposer. R-EO's unsolicited proposal file is being transferred to P&C. R-EO will continue to provide programmatic support and assist in evaluations. ✓

9/9/68

B  
9/14

1. APOLLO: The resident MSC Apollo office at NAR and at Grumman have been alerted to the difficulties encountered in the over-torquing of the J-2 engine attach bolts. The resident Manufacturing Engineering Laboratory personnel will provide MSC and both contractors with additional details contained in the McDonnell/Douglas reports and ECP. The revised MSFC torquing specification will also be transmitted as soon as it is approved. ✓
2. ORBITAL WORKSHOP ATTITUDE CONTROL SYSTEM: The propulsion system is an in-house endeavor: we are committed to manufacture both test and flight hardware. At this time, as expected in programs of this nature, test articles not originally planned for are added to the program. One such article is the "flow decay test fixture". The purpose of this fixture is to test the restrictions to the flow of propellant caused by the gradual build up of salt deposits on the inner tube and component walls. The apparatus is being completed today, one week ahead of schedule.

Another test article, not originally planned for, is the "dynamic breadboard system" which will be used to verify the system with respect to pressure surges flow characteristics, line vibrations, etc. The breadboard is progressing on schedule and delivery is planned for early October.

These articles are being built to allow various characteristics of the system to be tested before the actual flight design is completed.

This example shows that the stretch-out of the AAP Program has not resulted in a reduction of the workload because critical items of hardware are built and tested in parallel with the ongoing engineering effort to improve and validate the ultimate flight design. ✓

3. COMPOSITES STRUCTURES MANUAL: A five volume compilation, prepared by this laboratory, of the latest available information on the application and processing of adhesives and potting compounds for structural and electrical use is being delivered to eighteen using activities at MSFC. This is the culmination of more than four years of effort and its availability will assist design, planning, manufacturing, and quality control personnel in efficient, reliable application of the latest methods in adhesive bonding technology. Revisions will be made as necessary to update the compilation. ✓



B3/14

NOTES 9-9-68 LUCAS  
9/9/68

1. SA-501 AUXILIARY PROPULSION SYSTEM (APS) ANOMALY TESTS: (Reference Notes 8-19-68 Lucas) Mr. Henry Pohl from the MSC Propulsion Division was a member of our assessment team to study what could have caused the decay in flight. MSC currently is only burp firing those engines pointing downward. Then they use a vacuum-bake procedure to dry out all propellants and vapors after the firing. We called Mr. Pohl again last week and he informed us that MSC intends also to eliminate burp firings after the next (205) flight. ✓
2. BIOASTRONAUTICS TASK TEAM: While you were in the laboratory last week, we presented to you our approach to the development of the AAP biomedical experiments. Robert Schwinghamer, Chairman, our whole task team, and representatives of R-ASTR and I-S/AA went to MSC on Friday for indepth discussions of these experiments. A representative from NASA Headquarters (Space Medicine) was there also. We didn't know he would be there. Fruitful meetings were held with Crew Systems Division personnel and principle investigators. As you know, the acceptance letter from Dr. Gilruth states that MSC will provide end item specifications. We anticipate their end item spec completion by 10-15-68, the initial PRR's at MSC (with our participation) on or about 11-1-68, with the subsequent PDR's to be held at MSFC. The medical people (Berry) seemed to be pleased by our potential participation in the experiment development. The Crew Systems Division people are not enthusiastic about our involvement but seem to be accepting it. At present, the situation is positive. ✓
3. SHORT STACK STATIC TEST: Mostly due to setup and instrumentation problems, this test program was approximately 2½ weeks behind schedule at the beginning of the week-end. To eliminate any further undue stretch-outs, MSFC is furnishing more support to Wyle Labs than was planned. High speed cameras and film processing are furnished by MSFC, also our closed circuit TV equipment will be utilized. A saving of approximately \$120,000 will be realized. We also had R-ME repair some damage incurred to the Service Module rather than have a crew from Tulsa come here. The Service Module was proof tested to 140% of test loads after repair. Testing is expected to start today. A minor fire occurred on Sunday (welding slag dropped on rubber bag) but significant damage did not result. ✓
4. S-II BATTLESHIP: The S-II Battleship was fired for 361 seconds on 9-5-68. This was the second firing with Lox antivortex baffles removed and cutoff was intentionally initiated by "drop out" of a thrust OK pressure switch. Quick look data indicates no adverse effect of the thrust OK cutoff and the antivortex baffle removal. North American Rockwell (NR) will now prepare an ECP to remove these baffles from S-II-3 and subs. ✓
5. LH<sub>2</sub> TANK INSULATION OUTGASSING SYSTEM TEST (OWS): In an effort to reduce program costs for the LH<sub>2</sub> tank insulation outgassing test, action has been taken to discontinue the Douglas Phase IB Coupon Tests. In addition, it is proposed that the role played by Douglas in Phase II (8-foot tank test at MSFC) be limited to the gas analysis effort only. This will mean an increase in work effort for R-P&VE in test monitoring, data analysis, and preparation of the test report. Total cost savings will be approximately \$1 million. ✓
6. LM/ATM PRE-PDR ASTRONAUT BRIEFING: On September 12, 13, 1968, our personnel will brief (pre-PDR) the astronauts on ATM Control and Display Panel dynamic simulation facility, plans, results, and schedule; the EVA design support status and simulation plans; and the basic ATM configuration. ✓

NOTES 9/9/68 MAUS

9/9/68

B  
9/14

### AAP GUIDELINES FOR POP 68-2

On September 9, 1968 we made Center distribution of the AAP guidelines to be used in preparing POP 68-2. These guidelines are based on the present proposed MSF AAP program. Amplifying guidelines will be distributed later by I-SAA. The target date for submission to MSF is October 15, 1968. ✓

### SLIDELL STUDY

General Bogart has recommended a MSF/OTDA/MSFC Study to develop an Agency position in response to GSA's informally proposed take-over of the Slidell ADP facility, and to define and evaluate other options for the provision of computational services to the MAF/MTF Complex. Mr. Gorman has concurred in the study with the reservation that it represents only a partial look at the MAF/MTF problem. Messrs. Stamy, I-MICH, Reeves, I-MICH, Mitchell, R-COMP, and Mallory, E-S have been selected for the study. ✓

NOTES 9-9-68 MURPHY

9/9/68

B 9/14

Advanced Study Activities in System Safety: In a meeting last week with Dr. Wild (OMSF Acting Director of Mission Planning and Operations), he indicated that they have a plan to set up a System Safety Working Group in the Advanced Study activities. This group is to be composed of members from OMSF, MSFC, MSC, and KSC. ✓

The purpose is to establish system safety requirements, criteria and guidelines to be utilized by advanced systems' planners and designers in the development of the program, systems, and hardware requirements and specifications. This planning will include both escape and rescue as well as preventative safety aspects. The initial effort is directed toward the two Earth Orbital "Space Lab" Studies which are expected to be let in March 1969 at a funding level of approximately \$2.2 million, each (one study would be managed by MSFC; the other by MSC). This work as it pertains to MSFC will be under the direction of Frank Williams' Advanced Systems Organization. We will provide system safety help to him as required. ✓

A formal request to you from Dr. Mueller for MSFC's participation in this Working Group should be here soon. ✓

NOTES 9/11/68 RICHARD

9/99/14

B 9/14

High Altitude Unsteady Flow Experiment: (Reference Dr Geissler's Notes of 8/12/68). The procurement times and schedule problems involved with this experiment make it impossible for AS-503. Since it will take a complete and workable story to get such an experiment on a Saturn V and since the data is not mandatory for a AS-503 flight, we will pursue a total package (justification, schedules, hardware, etc.) for the earliest possible vehicle flight. We have discussed this with I-V and R-AERC. ✓



NOTES 9/9/68 SPEER

9/9/68

B  
9/14

1. AS-205 Launch Mission Rules Review: The OMSF review of the AS-205 Launch Mission Rules was held at KSC last Thursday and chaired by Petrone and Schneider. In general, there were fewer problems identified than on previous missions. The most significant launch vehicle discussion centered around the wind constraints, the hazardous gas detection system and its redlines, and the identification of alternate measurements to satisfy redlines in the Launch Rules. Action items relating to these items are being worked by the cognizant elements on a priority basis. ✓
2. Saturn-Apollo Consumables Evaluation: We had planned to perform L/V real time consumable evaluation, both at MCC Houston (primary) and at the HOSC (backup). This would predict such things as time to depletion vs. time to velocity cut off, APS propellants remaining and other consumables important for flight control. In a surprise move Kraft has now requested that the primary (and perhaps only) consumables evaluation be performed at the HOSC because of computer saturation at the Control Center. We are assessing the impact of implementing the real time program, participating in MCC simulations, etc. This kind of a job is also attractive for AAP applications. ✓
3. Saturn Simulation Math Model for Flight Control: As a result of a series of reviews of the Saturn L/V simulation math model, MSC (Kraft) has asked MSFC formally to supply three additional individuals to up date the model which has shown to be inadequate in many ways. Due to our present personnel problems, arrangements have been made to have this support provided by contractor personnel. This is agreeable to Kraft. The overall effort will be under the direction of our MSFC Flight Control Office. ✓
4. ATM Data Management: As a part of our continuing effort to define the ATM total data requirements and provide for effective data management, we have started a series of reviews with the Experiment Principal Investigators (PI's). The purpose of these reviews is to identify the PI's requirement for real time and delayed real time data for contingency analysis as well as the engineering data. To date, reviews have been held on the X-Ray Telescope Experiment with Mr. Milligan, the PI, and on the White Light Coronagraph Experiment with Dr. Goslin (representing Dr. Newkirk, the PI) and Ball Brothers (prime hardware contractor). ✓

R  
9/14

NOTES 9-9-68 Stuhlinger  
9/9/68

1. IRRADIATION OF NUCLEAR EMULSIONS FOR ATM: A total of 18 nuclear emulsions from five experimenters (Dr. Stiller, Naval Research Lab; Drs. Heckman and Dauber, Lawrence Radiation Lab; Dr. Klarmann, Washington University; and Dr. Fichtel, Goddard Space Flight Center) were irradiated at Space Radiation Effects Laboratory last week. Doses to the emulsions ranged from  $5 \times 10^6$  p/cm<sup>2</sup> to  $1.6 \times 10^8$  p/cm<sup>2</sup>\*, which are equivalent to two days and three weeks respectively in an ATM-type orbit. Because of the small amount of machine time allotted to this experiment, we were not able to obtain a spectrum measurement behind the wheel. The success of the spectrum simulation will not be known until the experimenters examine their emulsions. All of the emulsions have been returned to the owners, and we are currently evaluating our data. ✓
2. PRESENTATION OF SOLID STATE WORK TO OART: Members of SSL gave a presentation to the OART Electronic Materials Working Group September 5. Our presentation covered the ZnO-solid state work that we have been doing. The working group is made up of top materials scientists and solid state physicists from universities, industry, and government installations. Their purpose is to review and criticize on-going NASA or NASA-related programs. Some of the presentations were severely criticized. Our presentation was received with interest, and we were quite encouraged by some of the comments. ✓
3. CONTRIBUTION TO SURVEYOR PROGRAM: Comments were furnished by SSL to Dr. John Lucas, JPL, on another draft of the thermal part of the overall Surveyor science report, "Surveyor Project Report, Part II: Science Results, Lunar Surface Temperatures and Thermal Characteristics." The Surveyor Working Groups were officially dissolved on July 1, but the work of the Thermal Working Group will be continued under the title, "Surveyor Data Analysis," and a meeting is planned late this calendar year. ✓
4. SPACE THERMOPHYSICS DIVISION CO-OP SYMPOSIUM: Eight co-ops who had been working during past months at SSL gave final presentations of their achievements in a lab symposium. The papers included a new method of measuring thermal conductivity, emission characteristics of postulated lunar materials and instrumentation for measuring this emission, the effects of water vapor on infrared measurements, narrow-band filter studies in connection with the solar magnetograph project, optical contamination of surfaces during a simulated thermal/vacuum test of an astronomy payload (such as ATM), and pyr heliometric measurements from the ground and from a light aircraft. ✓

\*Particles per square centimeter.

NOTES 9/9/68 TEIR

9/9/68

B  
9/4

AS-205 MISSION STATUS: The AS-205 space vehicle (launch vehicle and spacecraft) should be ready to start CDDT preps on schedule September 11, 1968, for a September 15, 1968, completion of the wet CDDT and September 16, 1968, completion of the dry CDDT. ✓

After considering the history of many J-2 engine firings and start bottle fills under the same environment as SA-205 without a fill line failure and after balancing the risk of scrubbing a launch due to such a failure against the undesirability of a late change, possible checkout schedule perturbations, requirement to weld with ordnance installed, and the risk of damage to other critical components during the change, we have made a decision not to change out the J-2 engine start tank fill line. We do not believe this change could be classified as mandatory. ✓

The major approved changes remaining on the launch vehicle are addition of the S-IVB LH<sub>2</sub> vent area insulation and the changeout of the S-IVB interface bolts, both of which will be accomplished after the CDDT. ✓

IU-213 AND 214: Reference is made to my September 3, 1968, weekly notes (copy attached) concerning the availability of ST-124M platforms and LVDC/LVDA spares for use in the production of IU-213 and 214. Our notes should have stated that at this time we only have two spare platforms to support the program through 212 and 515 and we have to produce an additional LVDC/LVDA to have a spare to support the program through 212 and 515. This means we will have to produce an additional two platforms and two LVDC/LVDA's for 213 and 214. ✓



9/9/68.

B9/14

1. MSC Personnel Change: Bill Stoney, Director of the Spacecraft Technology Division under Max Faget, has accepted a position in the Headquarters Apollo office and will be moving in the near future. No successor has been named to date and the outcome of the organizational arrangement will probably be affected by John Hodge's new organization. We have had several meetings with John and have established the beginning of what I think will be excellent working relationships. ✓

2. Space Station Planning: Rene' Bergland is now located in John Hodge's office at MSC. He is coming here 9/10/68 to discuss MSFC/ MSC cooperation, coordination, and ideas in several areas of space station planning. John visited us about a month ago to discuss his new planning office and compare notes regarding his plans and thinking and how we go about our job. ✓

3. Nuclear Program: Mr. Priest attended a working session of the Rover Flight Safety Panel, SNPO-Cleveland, on August 28. SNPO, SNPO-C, Lockheed, Aerojet, and Westinghouse were in attendance. The purpose was to outline an approach for developing flight contingency plans for the nuclear engine/stage in the event of engine malfunction. Aerojet and Westinghouse, with some help from Lockheed in the trajectory area, are to perform malfunction and fault tree analyses on the engine system and components to establish contingency plans for representative missions. Another working session is planned on September 23 at Aerojet in Sacramento. As you can see, Headquarters is, I feel, continuing planning in order to lay proper ground work for the day when we will have stage approval. ✓

F.W.  
Dr. Paice  
is all for  
a Sat. V

planetary  
probe  
(Commanded)  
for the

post-1975  
period, using  
a Sat. V with  
nuclear 2nd stage!

B

4. Biotechnology Laboratory Study Presentation: This presentation has been rescheduled to September 17, 1968, in order to conform to your schedule. The memo of invitation will be distributed September 9, 1968, and an agenda will follow shortly. ✓



Sept 16, 1968

NOTES  
MR. GORMAN'S COPY

SEP 16 1968

*With comments  
(none for DEP-A)*

RECEIVED DEP-A

1968 SEP 24 PM 1 30

NOTES 9/16/68 BALCH

B<sub>2</sub>/19

MISSION:

9/16/68

S-II-5 - Stage is in the Vertical Checkout Building where thrust structure and flight instrumentation mods are in process. Reinstallation in the A-1 Test Stand is still scheduled for 10/8/68. ✓

S-II-6 - Cryogenic proof pressure test is still set for tomorrow, 9/17/68. Static firing is still scheduled for 10/1/68 but is still dependent on timely delivery of new pre valves, nor promised on 9/24/68. ✓

S-IC-7 - Stage arrived at MTF on 9/12/68 and was installed in the B-2 Test Stand on 9/13/68 as planned. Power is scheduled to be applied to the stage on 10/1/68. Static firing is scheduled for 10/22/68, but prospects of meeting this date are marginal because of extent of modification requirements. ✓

Reference your question of my NOTES of 9/19/68 as to what kind of significant discrepancies there were on the S-II-5 static firing - Particular problems noted as a result of quick-look review by MTF revealed that position indicators on the LH<sub>2</sub> vent valves and one LH<sub>2</sub> pre valve did not function properly and had to be replaced. ✓

GENERAL

Public Affairs - Planning is underway for observance at MTF of NASA's tenth anniversary on the weekend of 9/28/68 and 9/29/68 with a "family day" open house, which will give all employees an opportunity to bring their families and community friends to visit the places where they work. ✓

NOTES 9/16/68 BELEW

9/16/68

B  
9/19

HEADQUARTERS' PRESENTATION TO DR. MUELLER ON LM-A

PROJECT: Headquarters' AAP Office made a brief presentation to Dr. Mueller September 7, on the LM-A project status. Dr. Mueller discussed the major recent decisions in the LM-A configuration, i.e., Crew Provision Stowage Module, Active Thermal Control System in the LM, removal of the Atmosphere Revitalization System for Environmental Control System, EVA from the LM-A, RCS tankage addition, and changes to accommodate unmanned rendezvous. Dr. Mueller's questions and comments were generally related to cost impact of including these features in the LM-A. ✓

ZERO "G" FLIGHT TEST: The aft dome section of the Workshop zero "g" hardware was flown in the KC135 aircraft at Wright Patterson Air Force Base to familiarize MSFC and McDonnell Douglas Astronautics Company (MDA C) with the hardware and its compatibility with the aircraft under reduced gravity conditions. No problems of significance were encountered and the flight was considered beneficial to both personnel and verification of flight worthiness of hardware under zero "g" conditions. ✓

EXPERIMENT MEETINGS: A Critical Design Review (CDR) was held September 10-12 on Experiments D019 (Suit Donning and Sleep Station Evaluation) and D020 (Alternate Restraints Evaluation). Attendants from MSFC included I-S/AA and R&DO. Four people from MSC attended, including Astronaut B. McCandless. The CDR was not in compliance with our requirements in that not all required software was available prior to or during the review. DOD is planning to conduct a delta CDR for the D020 "Fixity Task Board". There are a number of integration problems unresolved such as unavailability of an approved ICD and interference of equipment with the egress hole in the Workshop. ✓

ATM CREW SYSTEMS BRIEFING: The ATM Crew Systems Briefing is currently in progress and appears to be well received by MSC. MSC recently requested that we arrange for the astronauts to use pressurized suits and perform some one "g" operations with the mockup in Bldg. 4755 in connection with the Preliminary Design Review. We had discouraged this thinking because the mockup is not of sufficient fidelity for a walk-through. After Thursday's briefing, the astronauts inspected the mockup and agreed that a walk-through would not be worthwhile. The crew inspected our progress on the C&D console simulator in Bldg. 4483, and they seemed impressed with it. ✓

DELINEATION OF MANAGEMENT RESPONSIBILITIES: John Disher called today (September 16) and informed us that Mr. Webb signed the Delineation of Management Responsibilities document without change September 10, 1968. A copy of the signed document will be furnished MSFC today. ✓

→ Bonnie O.K. 9/23/68  
Please get me a copy  
B



9/17/68

B/s/k

TERMINATION ACTIVITIES - TWX's were sent to Rocketdyne last week partially terminating the eight F-1 and three J-2 production engines. With the exception of a very few items involving critical skills, each part will be carried to completion of the present operation only and stored in its in-process state. ✓

H-1 ENGINE - During the turbopump LOX seal retrofit on SA-207 at Michoud, the engine in Position No. 1 was found to have sustained damage to the LOX inducer and the Kel-F liner. Although inspection has not been completed, it appears that the damage was caused by ingestion of a foreign object during the cluster hot firing conducted at MSFC in September 1966. Disposition instructions will be issued after the extent of damage has been determined. ✓

F-1 ENGINE - F-1 Soft shutdown - The filter provided in the gas generator ball valve control lines to allow orificing to soft shutdown of the F-1 engine has failed in laboratory and engine tests. Two vendors are redesigning their filter for this application. If the redesign is successful, the advanced orders already placed would provide kits for KSC prior to CDDT of AS-503.

The Rocketdyne shakedown inspection of engines on S-IC-3 revealed a total of 138 minor squawks (Reference Notes 8-12-68). All squawks have been cleared. Only four UCR's (Unsatisfactory Condition Reports) resulted from the squawks list and all of these UCR's have also been cleared. ✓

J-2 ENGINE - Recently R&DO established a pressure cycle limitation for the J-2 engine start bottle using the ground rules established by fracture mechanics theory. Previously there had been no limitation and this parameter was not formally documented on a routine basis. When the detailed files were searched, preliminary findings indicated that three of the start bottles on J-2 engines installed on AS-503 had exceeded the pressure cycle life established by the fracture mechanics criteria. However, further study revealed that the three bottles are good for 12 more full cycles since some of the cycles were only partial cycles. (A full cycle is defined as reaching maximum operating pressure).

Coincident with the above, it was learned that three of the start bottles on AS-503 were of an early vintage which had been proof pressure tested at 1400 psi (1.2 times operating pressure) rather than 1800 psi as required to demonstrate a safety factor of 1.5 times operating pressure. Meetings are now underway to determine what course of action must be taken on these three bottles. The alternatives are: fly as is; proof pressure the bottles in place with a higher pressure than 1400 psi; or replace the three bottles. A decision is expected prior to the AS-503 DCR (September 19, 1968).

NOTES 9/16/68 CONSTAN

9/17/68

B  
8/20

The New Orleans Federal Executive Association sponsored an essay contest on "How Best Can the Human Relations Committee Serve the City of New Orleans." The contest was open to the 53 Federal agencies in the New Orleans area, employing approximately 14, 000 employees. Of the five top places, first place went to Mrs. Frances Prendergast, third place to Mrs. Althea Schwarzwaldler, and honorable mention to Mrs. Norma Wimbish, all MAF employees. ✓

B  
9/20

9/17/68

1. Support to MSC on Longitudinal Coupling: We have been supporting MSC in the analysis of AS-503 and 504 for longitudinal-lateral coupling effects. Our results show that no problem is identifiable at this time. This is due to (1) reduction of the longitudinal forcing function through POGO fix to a low level of random thrust fluctuations; (2) change in frequency content of forcing function; (3) change in LEM mode frequency due to weight and configuration changes - AS-504; and (4) AS-503 uses a LEM simulator which has no lateral-longitudinal coupling, hence no coupling problem. ✓
2. Longitudinal-Lateral Coupling: Personnel from Bellcomm visited us this week for the purpose of discussing our simulation of the longitudinal-lateral coupling observed on AS-502. The information is to be incorporated into a report George Hage is making to Congress on the Saturn V oscillation problem. ✓
3. Air Force Atmospheric Research Satellites: A meeting was held last week at the Air Force Space and Missile Division to discuss use of high resolution density data measured by Air Force research satellites for the purpose of improving atmospheric models. Dr. L. DeVries of our Aerospace Environment Division was invited to participate. Major meeting topics follow: (a) The Low-G Accelerometer Calibration System (LOGACS) was flown on an Agena vehicle in May 1967. A preliminary low altitude (140-200 km) atmospheric density model was derived from the drag data obtained. (b) The CANNONBALL Satellite (OV1-16) was orbited July 11, 1968, with a perigee and apogee of 80 and 305 n. mi. respectively. During the lifetime of 39 days, 10 hours of precise drag data were obtained from a tri-axial accelerometer system in the satellite. ✓ (c) The Solar Perturbation and Atmospheric Density Experiment Satellite (SPADES), placed in a polar orbit July 11, 1968, with an 85 n. mi. perigee, is measuring atmospheric density and contains several solar and atmospheric composition experiments. Five 20-day LOGACS missions are planned for 1970, and follow-on CANNONBALL and SPADES satellites will be orbited. Density data from the Air Force research satellites will be given to us shortly after they have been reduced. The high-resolution and accuracy of these data will aid in the development of atmospheric models which will be much more representative of the real atmosphere than any model currently available for our orbital dynamics work. ✓ At this time there are considerable problems with orbital density model development due to boundary conditions in the 100 to 150 km altitude region. We feel our participation with the Air Force will provide data not otherwise available. ✓

9/17/68

1. S-IC PROGRAM: The foam expansion problem experienced with S-IC-1 and S-IC-2 distributors has recurred. Investigation revealed that Boeing did not implement the process change which they had proposed to correct this problem. Distributors manufactured for stages S-IC-3 through S-IC-9 are complete and foam expansion is expected. R-ASTR is currently evaluating the Boeing recommended fix for these distributors. Distributors for S-IC-10 and subsequent will be processed per Boeing's original recommendation. We are recommending reinspection of S-IC-3 through S-IC-9 distributors, not longer than two months prior to launch, and trim back of expanded foam as necessary. ✓
2. ENGINES: Shakedown inspection of J-2033 (S-IVB-205) has been completed at KSC by Rocketdyne with our participation. Several minor discrepancies were found and Rocketdyne is in process of correcting them.
  - o Disassembly of F-1 engine S/N 6067 is approximately 70% complete. A sample of hydraulic oil from the control system of this engine was analyzed and the results agreed with the original sample taken from the engine upon arrival at this Laboratory, i.e., grossly contaminated with black particles. Each component in the control system will be sampled to see if the source for contamination can be determined. Close inspection of seals will also be made as each component is disassembled.
  - o The Rocketdyne quality survey, with principal emphasis on contamination, is in progress. We are encountering some discrepancies in manufacturing planning which should have been corrected from our last survey. For instance, processes calling for a de-burring operation after a part has been lox cleaned. ✓
3. IU STRUCTURE: Updating the information furnished in paragraph 1 of the NOTES 9-9-68 GRAU (copy attached), both AS-205 and AS-503 are considered flightworthy at this time. ✓

ATTACHMENT: NOTES 9-9-68 GRAU (Copies to Dr. von Braun and Mr. Weidner only)



B  
9/20

9/16/68

1. ATM Astronaut PDR Briefing. As the request of MSC, we held at MSFC last week an ATM Preliminary Design Review for the astronauts. In addition to the astronauts, several members from the MSC Project Office and Flight Operations and NASA Headquarters attended. The review primarily stressed crew operations and went well. Since some of the astronauts (McCandliss, Weitz and Kerwin) were new to ATM, the review also served as an indoctrination for them. The ATM PDR will be held next week at MSFC. ✓
2. ATM Funding. ATM funding at the present time is lacking in all areas. We have just been advised that no more stock withdrawals from TM Branch can be made on ATM and Finance is returning ATM procurement requests for materials. R&DO is working with IO to alleviate this condition. The problem is non-receipt of AAP spending authority from Headquarters for funding supposedly in the AAP budget. ✓
3. Personnel Note. Herman Thomason, Deputy Chief of the Inertial Sensors and Stabilizers Division, received his doctorate in electrical engineering from the University of Alabama. ✓
4. Astrionics Laboratory Hybrid Simulation System. The hybrid simulation system which has application to Saturn, ATM and other hardware problems is nearing a state of completion. The facilities are totally prepared; the digital part of the system has been shipped and the analog portion is due to be shipped this week. Installation and checkout by the vendor will follow and the target date for completion of the system is January 1969. This system will significantly enhance the Laboratory's capability in the area of hybrid simulation. Specific areas for this simulation will be in conjunction with ATM CMG and fine pointing simulation fixtures to verify ATM pointing control system design and flight program verification for Apollo. ✓

NOTES 9/16/68 HEIMBURG

B  
9/20

ACCESS ARM NO. 9 (AA-09-01) Subsystem testing was successfully completed on 9/9 and system testing was begun on 9/10. Testing is progressing well ahead of schedule. Barring any unforeseen difficulties, testing on the AA-09-01 arm system may be completed next week. ✓

S-II STRUCTURAL TEST PROGRAM Test, Phase VIB, 'Flight Limit S-IC Cutoff. Load Interval Sequence', is scheduled for 9/17. This test was delayed to allow sufficient time for R-ME to repair the cracked ring baffles in the S-IC portion of the LH<sub>2</sub> tank. ✓

F-1 TURBOPUMP (POGO) One turbopump POGO test was successfully completed on 9/12. For this test the lox pump inlet pressure was 60 p.s.i.a., the lox pre valve cavity was bled (cavity full of lox), and the lox suction line was pulsed from 2-22 c.p.s. A second test was attempted at 70 p.s.i.a. lox pump inlet pressure; however, it was terminated prematurely after 25 seconds of mainstage due to a circuit breaker in the electrical power system tripping. According to P&VE, they have sufficient test data to solve the POGO problem; therefore, any remaining POGO tests will be conducted on a non-interference basis with other test programs. No POGO testing is scheduled this week at the Turbopump Facility. ✓

S-IVB (MSFC) Test No. S-IVB-064 was conducted at the S-IVB Battleship Test Stand (MSFC) on 9/11, utilizing engine J-2050 for a planned duration of 100 seconds. This was the initial test on the S-IVB fuel tank internal collector manifold, a possibility to reduce residuals in some future flights. ✓

S-II-6 (MTF) S-II-6 is installed in Test Stand A-2 at MTF. Preparations are presently underway to conduct a cryogenic proof pressure test on 9/17. Two new Parker LH<sub>2</sub> pre valves (Engine Nos. 2 and 4) have been installed for the proof test. All 10 of the new valves are scheduled for installation prior to the acceptance static firing scheduled for 10/1. Plans have also been made to static fire S-II-6 with lox sump baffles removed and the new inverted screen installed. Recent Battleship tests indicate that draw-down characteristics may be better without the baffles. ✓

S-II-5 (MTF) S-II-5 is presently in the Vertical Checkout Building at MTF undergoing modifications on the thrust structure and completion of modifications to the flight instrumentation system. The stage is scheduled to be reinstalled on the test stand for post-static checkout on 10/8. ✓

F-1 ENGINE The No. 2 fuel suction line was blind flanged on the West Area F-1 Test Stand and fuel pulsing tests were conducted to aid in separating the controlling parameters of the suction line resonant frequency from the previous engine firing tests. ✓

B  
8/20

NOTES 9-16-68 HOELZER

9/16/68

Nothing of significance to report.

9/16/68

B  
9/20

1. S-II LOX Sump Baffles: The decision has been made to delete LOX Sump Baffles on S-II-3 and subsequent stages based on data from the latest S-II battleship test. ✓
2. S-II Battery Mounting: On September 11, 1968, NR/SD and MSFC agreed that the S-II batteries are qualified and flight worthy in the present installation configuration. The battery failure which occurred on August 15, 1968, in quality maintenance testing was due to testing to levels and durations in excess of flight requirements. No changes to S-II-3 and subsequent stages are required. However, two batteries will be tested to vibration levels agreed to by R-P&VE and NR/SD, with completion scheduled prior to AS-503 CDDT. ✓
3. S-II Hydrogen Tank Entry: An S-II hydrogen tank entry kit was proofed in the dynamic test vehicle last week. The kit was developed to permit safe entry into an S-II stage in the stack at KSC. The equipment performed well and was observed in operation by KSC personnel. ✓
4. S-IVB-504 to KSC: S-IVB-504 was delivered to KSC on September 12, 1968, via the Guppy. ✓
5. Contractor Phase-down: As a matter of general interest, the Saturn Instrument Unit - related workload at IBM-Owego and Bendix-Teterboro is about five percent of their total workload in FY-69 and will be considerably less in FY-70. ✓




9/16/68

B  
9/20

Support of Congressional Budget Presentation by Research Division, OART-  
In response to a request from Dr. Kurzweg, the program conducted by the Center under the auspices of the Research Division of OART has been examined for the purpose of identifying exhibits, visual aids and data of possible interest to the Congress in support of the budget submission. The package available this year is somewhat less than those available in the past few years. This appears to be essentially due to the late start of new activities in FY-1969 coupled with a relatively high number of planned completion of efforts initiated in FY-1965 and FY-1966. ✓

OMSF Supporting Development - Plans are currently being made for the next Supporting Development Quarterly Review which is now tentatively scheduled for the week of October 21 in Houston. It is proposed that this review be used as a session to discuss policy which will determine the future of the OMSF applied research activities rather than to attempt to present "pay-offs" as has been the agenda of the October meeting in the past. An effort is being made to assure attendance at the meeting by Dr. Mueller, Messrs. Mathews and Donlan and the Center Directors of the OMSF Center. Neither the date nor the agenda for the meeting is completely firm at this time. ✓



Bonnie

Is this firm?  
Could Mr. Rees attend it?

B

9/17/68

B 2/20

1. Cleanroom for Assembly of ATM: For the assembly work of the ATM systems an assembly cleanroom of a class 10,000 or better is needed. To date, we have only cleanrooms for smaller size hardware like the valve clinic. The acquisition of such a facility is not only mandatory for the ATM project but would be very helpful for many scientific experimental hardware projects in the future. The NASA Program and Facility Offices have reviewed the requirement and approved this cleanroom to be built inside Building 4755 -- if the cost can be limited to be under \$250K. Our original proposal has been priced out to cost approximately \$450K. We are now studying possible trade-offs between size of the cleanroom and cleanliness level with possible future growth potential in size and quality. ✓

2. S-IVB Tooling Relocation: MDC has proposed and presented to NASA a plan to move S-IVB weld tooling, with exception of the ring welder and the X-ray room from Santa Monica to the Huntington Beach Facility. Primary purpose of the relocation is to make more space available in Santa Monica for the production of DC-10 nose sections. All costs resulting from the move will be charged to the Long Beach Aircraft Division. All welded assembly operations for vehicle 515 will be completed at Santa Monica prior to the move. The equipment will be installed at Huntington Beach to maintain full production capability. Time period of relocation is from December 1968 to completion of re-certification by February 1969. ✓



NOTES 9-16-68 LUCAS

B 9/20

Shop  
Please pre-  
pare  
condolence  
letter

1. PERSONAL: Vaughn (Rusty) Seitzinger, Chief of our Ceramics Section, and the father of the M-31 insulation on tails of S-IB and S-IC, ceramic gold on tail of Jupiter and several other inventions, was killed instantly late Saturday in a car accident while returning from Duke University where he left his son to begin his freshman year. His wife and daughter who were in the car with him were not hurt seriously.
2. SUNSPOT I EXTENSION (VACUUM FACILITY): The three-foot extension section has been added to Sunspot I bringing its working space to 10.5' X 15.5'. The extension shell has been evacuated to  $8 \times 10^{-8}$  torr, leak-checked and found to be leak free. The first test requiring this extra space will be the ATM Quarter Rack Test, scheduled to begin in October, 1968. ✓
3. MULTIPLE DOCKING ADAPTER (MDA) BASELINING ACTIVITIES: An MDA Configuration Control Board has been active for approximately five weeks. A Configuration Management Plan was issued to establish proper guidelines for our designers. We are making a concentrated effort to baseline all requirements and released design documentation. ✓
4. "A" STRUCTURE RING BAFFLE: The ring baffle web and cap in the second lowest full ring in the "A" structure LH<sub>2</sub> tank (formerly the S-IC-S stage) has been found to be cracked for a total length of approximately 90 inches. Cause of the cracking is suspected to be stress corrosion coupled with the very low ductility of 7079-T6 aluminum alloy at LH<sub>2</sub> temperature (-423°F). Doublers will be installed on the broken parts and testing will continue. ✓
5. J-2S PROGRAM: The J-2S development testing program reached a milestone on 9-9-68 with a successful restart triplet (one start, two restarts) using the solid propellant turbine spinner (SPTS) and associated equipment. This test demonstrated proper electronic control assembly sequencing and continuity, endurance of the electronic bridge wire firing units to main-stage environment, and the isolation of the SPTS units, preventing chain reaction ignition or cross fire between units. Post test inspection after the three run series revealed a crack in the longitudinal seam of the tapoff duct. The engine system has been scheduled for repair and shipment to Arnold Engineering Development Center (AEDC) for altitude testing. Engine system J-2S 112 is ready for installation for further sea level demonstration at Santa Susana Field Laboratory. ✓
6. INTERNAL AND EXTERNAL ASTRONAUT MOBILITY/STABILITY AID SIMULATION: KC-135 Zero-G testing was conducted last week at Wright Patterson Air Force Base (WPAFB) to determine the maximum force a subject can put on a handrail under pressure suit and shirt-sleeve conditions. This work will be correlated with the preliminary work that was done in a five-degree-of-freedom simulator at MSFC. Also tested were EVA manual translation aids and OWS penetration seal plugs. We had two flights, one of 19 parabolas and one of 43 parabolas. ✓
7. INVENTION AWARD: Mr. Keith Demorest has received an invention award for his patent on MLR-2 dry film lubricant. ✓
8. BIOMEDICAL EXPERIMENTS: You may recall during the last AAP Baseline Meeting, MSC was assigned an action item to justify the objection to moving the biomedical experiments to the Orbital Workshop after activation. We managed to obtain a copy of a presentation on this subject which was made to Mr. Thompson of MSC. MSC's study does not conclusively prove that the experiments should remain in the MDA, and MSFC's study did not satisfactorily prove that they should be moved. Thus, the solution to this problem is a management decision. ✓



9/16/68

B  
9/20

EXCEPTED PERSONNEL POSITIONS - At the request of Manned Space Flight the Congressional Budget Submissions FY-69 showed seven more Excepted positions at Marshall than were allocated. These positions were distributed as follows: Director's Office - 3; Executive Staff - 2; Safety Office - 1; and Asst. Dir. for Scientific and Technical Analysis - 1. It is significant that MSF selected Marshall to incorporate these spaces. This infers that MSF felt that Marshall's grade structure could accommodate additional Excepted positions. ✓

DEVELOPMENT OF THE FY 1970 AGENCY BUDGET PLAN - We have received a copy of a draft memorandum to Program Directors from Dr. Paine which outlines the process and procedures which will be used to develop the FY 1970 budget plan. The BOB submission date for the Agency's estimate is September 30, 1968. The BOB planning guidance provides for a \$3.6B FY 1970 level with provision for the Agency to request consideration of high priority program additions. ✓

Beginning September 23, a series of management meetings will be scheduled to review budget plan proposals and discuss the major questions and issues. The budgeting process will include three major phases. Phase 1 is the development of a FY 1970 budget plan in response to the \$3.6B planning figure provided by the BOB. Phase 2 allows each Program Director to present recommendations for program adjustments, extensions, and new starts to the baseline established in the first phase. (Dr. Paine relates that previous communications with the Bureau have indicated that the base program plus necessary program expansions and new start activity would approximate \$4B.) The third phase will place the first two phases in perspective to accomplish the most economical utilization of the Agency's capabilities. ✓

OVERSIGHT COMMITTEE STAFF STUDY - Congressman Teague's letter of September 9 to Dr. Mueller and the Center Directors states that the NASA Oversight Committee Staff Study of Apollo Management will be completed prior to the convening of the next Congress. However, a planning schedule provided through Capt. Freitag's office by Mr. Wilson and Mr. Gerardi, who will conduct the study, shows a tour in connection with the study being made during the period October 2 through 30. A visit to Marshall is planned for October 3-5 and Michoud would be visited October 6-8. We have advised Capt. Freitag's office that the dates for the MSFC visit conflict with the current dates for the AS 205 Flight Readiness Review. The study will be an in-depth review of major management actions on Apollo program events and/or problem areas. It is expected that the study will demonstrate that the Apollo Program has made major contributions in the development of management of large and complex technological efforts. ✓

Bonnie  
Has this time  
conflict been  
resolved?  
What am I  
expected to  
do? B



NOTES 9-16-68 MURPHY

9/17/98

B 9/20

Negative report.

NOTES 9/16/68 RICHARD

9/17/68

B  
9/20

No submission this week.

NOTES 9/16/68 SPEER

9/17/68

B 9/20

AS-205 FLIGHT MISSION RULES REVIEW: The Mission Director (Schneider's) review of the 205 Flight Rules was held by telecon last Monday (9/9). Two controversial manual abort rules were discussed. MSFC had recommended the crew abort during launch phase for loss of S-IVB LH<sub>2</sub> tank pressure, using the redundant tank pressure displays in the command module. MSC did not wish to do so because the S/C pressure displays have not been previously flight tested (new on 205). It was decided not to use the S/C displays as primary cues but to depend on an abort request from the Mission Control Center; it was recognized that the ground reaction time is too long to safely protect against some tank pressure failures early in S-IVB burn, and the risk was accepted. MSC agreed that successful 205 onboard displays would be considered satisfactory verification for AS-503. ✓

The other controversial item is the Crew Safety Panel's recommended abort based on roll error and Q-ball limits during max Q in the event of an engine actuator hard over failure in combination with certain winds. The crew wishes to wait for an automatic abort based on vehicle overrate rather than use the Q-ball limits. MSFC pointed out the additional escape time (approximately 1 second) provided by using the Q-ball for some malfunctions; Schneider will discuss this rule further with the crew. ✓

B  
9/20

NOTES 9-16-68 Stuhlinger

9/17/68

No submission this week.



NOTES 9/16/68 TEIR

9/17 JLS

B 9/20

AS-205 MISSION STATUS: As a result of spacecraft activities taking longer than estimated, T-0 of the wet CDDT was rescheduled to 10:00 AM CDT today. There were no significant space vehicle problems encountered in the first attempt to run the wet CDDT. A number of facility problems have developed today but all of these have been corrected. An S-IVB GSE problem is now holding up countdown at T-4 hours, 15 minutes. Two S-IVB <sup>bulkhead circuit</sup> LOX vacuum pumps have failed during the past 24 hours. This pump is used to pull a vacuum on the S-IVB common bulkhead for the purpose of sampling the bulkhead inner area for any LH<sub>2</sub>/LOX leaks. A pump is now being removed from one of the inactive complexes to replace the failed pump on LC-34. The launch window stretches from 10:00 AM CDT to 3:00 PM CDT. Our chances of staying in the launch window are somewhat marginal based on the estimated time for changeout of the pump. No failure cause has been established yet. The first failed pump is presently being disassembled for analysis. We will keep your office up-to-date throughout the day. ✓

NOTES 9/16/68 WILLIAMS

9/17/68

B  
9/20

1. Lunar Program: MSC has provided us a preliminary lunar science and lunar roving vehicle plan and has promised a final version by September 30, 1968. Space Sciences Laboratory has been provided a copy for review. J. Belew, R-AS-ML, and R. Love, R-P&VE-AAL, attended a meeting and lunar roving vehicle demonstration at Grumman on September 10 and 11 (Ben Milwitzky, Headquarters (MAL), also attended). An excellent demonstration and actual driving of the large MOLAB type LRV and a smaller 4-wheel LRV was accomplished. Remote driving was done with the lunar distance time delay integrated. A trip to the assembly area was also taken. ✓

2. Unmanned Planetary Program: A meeting was held in Headquarters among personnel of OSSA, OMSF, and SNPO to discuss the request by Dr. Paine that OSSA consider utilization of nuclear propulsion in the unmanned planetary program. One of Dr. Paine's interests in this request is the question we have posed many times; namely, could some sort of unmanned spacecraft be flown on initial test flights of nuclear stages? Consequently, a significant part of the subject study will be devoted to consideration of such a mission. We are currently defining objectives, flight profile, operational constraints, etc., for a first nuclear flight test which will be discussed at the next meeting (9/18/68). ✓✓

12  
3. Nuclear Program: Mr. Webb has decided that one nuclear experimental engine test (XE-2) will be conducted at the Nuclear Rocket Development Station (NRDS). This will be the last test of any significance in the nuclear program until NERVA development go-ahead is received. As a consequence, the Aerojet NERVA technology manpower will go from something over 400 now to zero by the end of FY 69. The total Aerojet manpower directed toward the NERVA program will be less than 200 by the end of FY 69. NRDS will, in essence, be mothballed after the XE test. ✓

4. Earth Orbital Space Lab (EOSL) Definition Contracts: Discussions with Frank Dixon (MTY) clarified Headquarters' intent in regard to contracting for the EOSL program definition which Headquarters considers the next major new start for NASA (not Apollo derivatives). It is planned that MSC and MSFC will administer two separate contracts of \$2.2M each. Identical work statements will be generated and issued by Headquarters in response to inputs from the Centers. The contractors will be selected by a single source selection board chaired by Headquarters, but which supposedly will have strong Center participation (this is a new method of contractor selection). Several other contracts will be entered prior (or parallel) to the start of the EOSL definition examining such subjects as maintenance concepts, on-board check-out, data management, etc. (a complete list of presently planned contracts and their dollar amount is attached.) MSFC is presently reviewing Headquarters' proposed task descriptions. Work statements will be written for these tasks which are delegated to MSFC for contractor selection and management. We plan to meet at an early time with MSC representatives to discuss implementation details of this new contracting approach and to assure mutual support in those areas where unique capabilities exist. We will also include Langley personnel in future discussions. ✓

Sept 23, 1968

3/68 - M/A. 10. 21

+

NOTES  
MR. GORMAN'S COPY  
SEP 23 1968

*With comments  
(none for DEPA)*

RECEIVED DEP-A

1968 SEP 25 PM 3 01



*file*

**NOTES**  
**MR. GORMAN'S COPY**

SEP 30 1968

*with comments*

*Geissler and James notes*  
*marked for Mr Gorman*  

---

*(have been answered)*

B 9/23

MISSION:

S-II-5 - Installation of thrust structure and flight instrumentation modifications is on schedule. New modifications may delay removal of stage from the Vertical Checkout Building and reinstallation in the A-1 Test Stand, which is now scheduled for 10/4/68. ✓

S-II-6 - Cryogenic proof pressure test was successfully accomplished on 9/17/68. New prevalues have been delivered and will be installed prior to static firing, which is still scheduled for 10/1/68. ✓

S-IC-7 - Special team from Michoud is at MTF for installation of POGO mods. Stage processing remains on schedule for "power-up" on 10/1/68. Prospects of meeting static firing schedule date of 10/22/68 are still marginal because of high-density workload. The test stand main derrick is scheduled to be out of commission until 11/1/68 because of requirement to rework the armature of the main drive motor. This is not expected to impact the stage test program, but all possibilities of impact are being investigated. ✓

INSTALLATION:

S-II Storage Planning - Based on studies we have conducted at MTF, the cost of one horizontal storage trailer for the S-II stage, complete with air-conditioned storage envelope, is estimated at approximately \$78,000. ✓

Weather Bureau Services at MTF - We have been advised by Mr. Ken Nagler, Chief, Space Operations Support Group, U.S. Weather Bureau, ESSA, that due to an ESSA, Weather Bureau cutback in personnel spaces, it will be necessary to terminate the services of the Weather Bureau at MTF about three months from now. The impact of this development is being determined. ✓

BOMEX - Planning for BOMEX is now underway. It is our understanding, having talked to Dr. Robert A. Summers, OSSA, that funds will be made available prior to 10/1/68. These funds will be directed to MSFC and not through OMSF. ✓

University Research - A presentation on the proposed business management of research activities to be conducted at MTF by Louisiana State and Mississippi State Universities was made to Mr. Hueter, Col. Mohlere, Mr. Cook, Mr. Dowdy, and others attending at a meeting at MSFC on 9/18/68. ✓

B  
9/23

MSFEB MEETING - SEPTEMBER 16, 1968: Dr. Mueller wants a complete reassessment of AAP experiment priorities due to the recent schedule slip. He requested these options: (1) Delete EVA experiments M508, EVA Hardware Evaluation; M509, Astronaut Maneuvering Equipment; and T020, Jet Shoes; (2) Include several earth resource options; (3) Consider flying some space manufacturing experiments on AAP-2 Saturn I Workshop (Dr. Mueller showed keen interest in manufacturing possibilities); and (4) Consider storage of experiments in the AAP-3A Service Module to be transferred by EVA into the Workshop for operations. Also, the MSFEB approved a new MSFC experiment M507, Gravity Substitute Workbench, based on it flying on AAP-2. The AAP-2 experiment assignments can be improved and MSFC shares Dr. Mueller's enthusiasm about space manufacturing experiments, however, we are concerned that we are apparently still far from an AAP-2 baseline list of experiments. The result is that both experiment development and integration efforts cannot be firmed up. ✓

BIOMED HARDWARE DEVELOPMENT: A meeting was held at MSC September 6, between their Biomed Research & Crew Systems groups and MSFC representatives (P&VE, ASTR, & I-S/AA). The purposes were to further familiarize MSFC personnel with hardware development requirements and to identify the additional necessary steps for MSC to decide which items MSFC will develop. MSC requested a formal proposal to identify the management procedures MSFC intends to implement, development approaches, key individuals, backgrounds and experience as related to these tasks, and associated resources available at MSFC. This proposal and a tour of our lab facilities are scheduled for October 10. We understand the MSC team will consist of Dr. Berry and the medical researchers. It is planned that experiments will be delegated to MSFC by mid November. ✓

AAP WEIGHT AND PERFORMANCE: The mission requirements panel has worked a number of flight mechanics schemes which, along with certain weight reductions (e.g., lightweight solar arrays), will give us desired growth margins on unmanned flights (approx. 3000 pounds on AAP-2 and over 2000 pounds on AAP-4). It still appears that the sub-orbital burn of the service module is required for the manned flights. MSC and MSFC will recommend that Mr. Luskin baseline this for AAP-1, 3A, and 3, at the planned September 25 weights review meeting. ✓

AAP PROGRAM MANAGERS MEETING, SEPTEMBER 18-19: We met with Mr. Luskin to status several AAP program matters. MSC foresees no difficulty in proceeding with the transfer of hardware development over the next two months. MSC also forecasted FY70 fund requirements that substantially exceed their current OMSF mark within NASA. ✓

H-1 Engine - Reference my notes of 9-16 concerning the damaged LOX inducer on SA-207, engine position no. 1. The engine has been removed and inspected. The inducer was found to be badly "nicked" on three of the four blades and a large gouge, with the appearance of threads, was found on the back side of one blade. The Kel-F liner has a 1/2" wide groove around the periphery. Also, the lip which retains the liner in the inducer housing was darkened. Indications are that the object passed through the pump. Disassembly of the engine is proceeding with LOX dome scheduled for removal today. The damaged engine will be replaced with a spare. ✓

F-1 Engine - Reference my notes of 9-16 pertaining to F-1 Soft shutdown for AS-503. Redesigned conical and cylindrical filters for the GG ball valve control line were received at Rocketdyne last week. The conical filter has completed laboratory tests (40 hours of flow and 240 cycles). A new fixture for cyclical testing of the cylindrical filter under transient flow has been designed. These cyclical tests should be complete this week. Engine verification testing has begun and should be complete by the end of November. If soft shutdown becomes a requirement for AS-503, installation would occur prior to completion of the verification test in the engine; however, the laboratory tests are rather severe and will provide confidence in the design.

Engine F-4023, which was removed from S-IC-3 in April 1968 due to fuel seal leakage, has been failure analyzed and reworked by Rocketdyne, thus providing a spare engine of the Qual I configuration to support the launch of AS-503. ✓

J-2 Engine - Reference my notes of 9-16 concerning the possibility of 3 start bottles on AS-503 engines having been proof tested at less than the required times operating pressure. A thorough search of quality control records has determined that only one bottle was tested at the reduced level. This tank is installed on an outboard engine of S-II 503 and has been accepted for flight after a detailed review of its inspection records. The tank is otherwise identical to other tanks from that vendor and has been exposed to four engine and two stage acceptance tests. This decision was discussed at the AS-503 DCR and agreed to by the board. ✓

Termination and Retrenchment - In conjunction with the partial termination notices issued last week for eight F-1 and three J-2 engines, our facilities retrenchment plan has been reevaluated. As a result of a recent meeting between Rocketdyne and EPO personnel, Rocketdyne has agreed to add MB-4 to the building which they plan to vacate. Thus, Rocketdyne is now planning to vacate a total of 352,829 sq. ft. of leasehold buildings, MB-3 (121,777 sq. ft.), MB-4 (182,752 sq. ft.) and the Eaton Building (48,320 sq. ft.). ✓



NOTES-CONSTAN-9/23/68

B 9/23

Nothing of significance to report.

1. Space Vehicle Oscillation Program Presentation, September 11, 1968:  
Cause of AS-502 structural failure has not yet been identified, nor has the LM been proven or disproven to be the cause of the structural failure. The LM vibrations, as observed in the AS-502 are real, and the simulation model which we have used has been verified by simulating conditions during various tests. As to the data shown at the above referenced teleconference (see attached sheet): (a) The variation of axial/lateral acceleration ratio of 3/1 on the AS-501 and of 1/1 on the AS-502 follows from the variation in structural characteristics and consequently different tuning of frequencies. (b) The supposed contradiction is that the Saturn V DTV (Dynamic Test Vehicle) with the symmetrical substituted LM (LTA - B = LM test article - B) did show cross-coupling. This observed cross-coupling was not caused by the LM but by the original single torsion (diagonal) tie of the CM/SM, and because tension ties were not sufficiently tightened. As expected, followup tests of modified ties indicated reduced coupling. (c) The LRC 1/10 scale model (last example on attached sheet) falls in the same category of the AS-501 and AS-502 structural variation and obviously happens to be not as critically tuned as the AS-502 with resulting reduction in acceleration ratio.

To restate our position on the LM design, which was given at the Senior Structures Assessment Panel and which was restated in the above referenced teleconference, the cross-coupling requires three elements to become effective: Driving force, coupling, and tuning. Flight AS-502 had all three elements satisfied which resulted in very large lateral amplitudes. All three elements will be removed on the AS-503: The POGO fix will reduce the driving force to noise level, the axial/lateral coupling will be removed by the LM substitution, and the tuning will be changed by the LM natural frequency. For follow-on flights, asymmetry of LM will reintroduce coupling, but the other two elements (driving force and tuning) could be safely eliminated if closely watched. ✓

2. Lunar and Planetary Surface Models: Dr. Ewald Heer of the Structures and Dynamics Research and Advanced Development Group at JPL visited Mr. O. H. Vaughan of our Aerospace Environment Division to discuss lunar and planetary surface models and other areas of mutual interest. The relationships of vehicle mobility and control to lunar surface models were discussed as well as surface models representative of the Mars and Mercury surfaces. Mr. Vaughan is continuing work on the proposed lunar surface model which is to be used in mobility studies using automated rover concepts. ✓

B  
9/23

1. ROCKETDYNE QUALITY SURVEY: Interim reports from the Rocketdyne quality survey reflect several areas with discrepancies. The most significant, to date, are Rocketdyne's inadequate planning and procedures, and their failure to comply with procedures and specifications. An F-1 main fuel valve was subjected to teardown and inspection. No problems were noted. A J-2 oxidizer turbine by-pass valve was subjected to a similar examination which revealed a bearing exhibiting galling and a snap ring (also found in J-2131 teardown) made of the wrong material. One very significant finding was a very low morale and pessimistic attitude among workers on the floor. ✓
2. LEM SUPPORT: The first audit to be performed by MSFC in support of MSC will be AVCO in Cincinnati, Ohio, beginning September 30, 1968. Three MSFC personnel will be required. They will travel to Bethpage, New York, September 25, 1968, and participate in a pre-audit meeting with the other two members from Bethpage on September 26-27, 1968. Four other audits are scheduled as follows: PCA - Burlington, Massachusetts - October 21, 1968; TRW - Redondo Beach, California - November 4, 1968; TRW - Redondo Beach, California - November 12, 1968; United Aircraft, Farmington, Connecticut - November 18, 1968. TRW has two major contracts and they are managed by two different divisions; therefore, two separate audits. The two major contracts are for the LEM descent engine and the abort guidance systems. ✓
3. IU PROGRAM: The IBM-Owego and IBM-Huntsville tri-annual meetings were held September 18, 1968. IBM-Owego deliveries are almost complete and a manpower phaseout has begun. Accordingly, the IBM-Owego LVDC/LVDA Project Manager has been assigned to IBM-Huntsville, and will manage the remainder of the program from Huntsville rather than Owego. There was some discussion about the possibility of IBM establishing a depot facility at Huntsville to accommodate repair/failure analysis support for the LVDC/LVDA throughout the flights of the Saturn vehicles. ✓



NOTES 9/23/68 HAEUSSERMANN

B  
9/23

1. S-II PU System. The S-II PU system has experienced transistor failures in the PU computers. The S-II PU system is designed and fabricated by McDonnell/Douglas. The system is susceptible to failure at power turn on. A preliminary investigation has revealed the possibility of electrical design problems in two areas of the S-II stage PU inverter system. The inverter system, which is part of the PU computer, drives the valve motors. The S-IVB P U system has a different design and is less prone to failure. This problem was not known to Astrionics Lab personnel until the contractor identified the problem at the 503 delta DCR. We are planning a trip to the contractor to get additional details. ✓

2. Visit of Dr. Kiepenheuer. Dr. Kiepenheuer and Dr. Grossman-Doerth from the Fraunhofer Institute, Freiburg, Germany, are presently in Palestine, Texas to participate in the preparations for the next balloon flight with the Spectro-Stratoscope, an advanced Stratoscope I system as formerly launched for solar observations by Professor Schwarzschild of the Princeton University Observatory. You know Dr. Kiepenheuer as the author of the excellent booklet "The Sun." ✓ To obtain experience which we might be able to apply to ATM experiments, I accepted an invitation for a review of the Spectro-Stratoscope and with some colleagues I will go by Gulfstream to Palestine on Wednesday 25 September. Dr. Kiepenheuer and Dr. Grossman-Doerth will return with us to Huntsville. A visit of Marshall and several laboratories is planned for the next day. ✓

W.H. → Would like to meet him  
if I'm in town.  
B  
you'll be in Washington  
Sh  
9/25/68



B  
9/23

ACCESS ARM NO. 9 (AA-09-01) We lost approximately 5 days of testing last week due to having to change out a leaking upper hinge deceleration valve. The deceleration valve problem occurred on 9/17, however, Boeing did not provide an acceptable replacement valve until 9/19. Retests to set the deceleration valve and cam accounted for the remaining lost time. We are now back in system tests and should complete the test program on AA-09-01 by 9/25. We have a meeting scheduled with KSC on 9/24, for the purpose of reviewing the test program conducted on AA-09-01 service arm to verify that all test requirements have been successfully met. ✓

S-II STRUCTURAL TEST PROGRAM The S-II (V7-21) stage structural test, Phase VIB, Flight Limit S-IC Cutoff Load Interval Sequence, was successfully accomplished on 9/20. The next test has been delayed for approximately two weeks due to an F-1 engine POGO test scheduled for 9/30. ✓

F-1 ENGINE Additional fuel pulsing tests (No. 2 fuel suction line blind flanged) on the West Area F-1 Test Stand were conducted to aid in separating the controlling parameters of the suction line resonant frequency from the previous engine firing tests. ✓

S-IVB (MSFC) Test S-IVB-065 was conducted at the S-IVB Test Stand on 9/19, utilizing engine J-2050. The main objective of the test was to confirm that no additional foil was in the injector. (Three small pieces of aluminum foil were found in the injector after Test S-IVB-064). This and other secondary objectives were satisfactorily met. ✓

S-II-6 (MTF A-2) In conjunction with the normal propellant load test, a cryogenic proof pressure test to 36.2 p.s.i.g. was successfully completed on 9/17. ✓ Delays were encountered in the countdown when the LH<sub>2</sub> fill line screen clogged, preventing flow into the stage from the barges. A timing problem with the prevalue latch on the new Parker valves will require lengthening the 1-second delay timer. The acceptance firing is scheduled for 10/1. ✓

S-II LH<sub>2</sub> TANK ENTRY KIT The S-II-LH<sub>2</sub> tank entry kit test conducted at the Saturn V Dynamic Test Stand was successfully completed and the kit shipped to KSC. ✓

NOTES 9-23-68 HOELZER

B  
9/23

NEGATIVE REPORT.

B  
9/23

1. S-IC-4 to KSC: S-IC-4 is scheduled for shipment from MAF today (September 23), and will be on-dock KSC on September 30, 1968. We found it necessary to transfer 100 manhours of open work to KSC because the hardware for four (4) design changes was not available. KSC has signed the open work certificate. ✓
2. S-II-6 Tests: Cryogenic proof testing of S-II-6 was successfully completed on September 17, 1968. Static firing is scheduled for October 1, 1968, with no delays anticipated. ✓
3. S-II-9 Corrosion: Corrosion was discovered September 16, 1968, on all LH2 tank frames of S-II-9. The corrosion, which is concentrated on the top side of webs and cap angles, resulted from an aluminum phosphate residue of the cleaning solution. The residue apparently resulted from a process deviation during cleaning. Present disposition is to hand-wipe with Freon and re-inspect just prior to shipment to determine if corrosion has been arrested. This disposition is currently being reviewed by P&VE Lab. ✓
4. Short Stack Test at Wyle: The first shakedown test was completed September 12, 1968. Difficulties in instrumentation and with the recording computer were experienced. Debugging is in process and completion of testing is expected in early November, about a month behind the original schedule. ✓
5. AS-503 Design Certification Review (DCR): I would like to thank all who assisted with the DCR. Comments were favorable and we had a minimum of action items not answered by the review. ✓
6. S-IU-504: A "status" meeting was held September 17, 1968 in lieu of a "turn-over" meeting due to checkout not being completed on S-IU-504. Flight Control Computer delivery on October 13, 1968, is agreeable with KSC and IBM. All open work is planned to be completed prior to shipment to KSC on September 30, 1968. ✓



B  
9/23

Review of MSFC Manufacturing in Space Program - Mr. Bill Armstrong, OMSF, spent Thursday at the Center reviewing our proposed Space Manufacturing Program. He seemed impressed with the verbal discussions. He requested written information on the proposed program by mid-October. He also requested specific information on experiments which could be available and compatible with the AAP-2 Flight. Some examples discussed were extension of the Electron Beam Welding Experiment to include a molten metal experiment and a crystal growing experiment. ✓

Withdrawal of Resources Authority - Headquarters has initiated action to withdraw AAP Experiment Definition Resources Authority for FY-68 on which obligation was blocked in mid-July. The total of such funds to be lost by the Center is approximately \$1,280,000. Efforts are being made to reinstate some of the Experiment Definition work which will be terminated if total authority is lost. ✓

Discussions with OART - Propulsion - On September 17, members of the Experiments Office Staff met with Dr. Tischler and members of his Staff to discuss the FY-68-69 Propulsion Programs. The discussions did not result in a firm plan for the Center; however, they did reveal that the emphasis within Propulsion Division for launch vehicle systems for the immediate future seems to be swinging firmly to the 260 inch solid booster. It was not immediately evident what role MSFC would be expected to play in that development program. ✓

OSSA Senior Council Meeting - I attended the OSSA Senior Council Meeting at Ames on September 19-20. This was the best organized, best run Senior Council Meeting that I have ever been in. The Launch Vehicle Division of OSSA presented a very definitive study on anticipated OSSA requirements and recommended that emphasis be placed on the development of the SLV3X (Fat Atlas)--Centaur combination. After much discussion, a counter recommendation was made that the Titan Family be more carefully studied with the view of perhaps dropping the Atlas completely from the vehicle family and treating the Centaur as a payload component, rather than a stage, to be used with the Titan III. ✓

B.J.

What  
specific  
actions  
for our  
marketing  
people  
would you suggest?

In the FY-70 new starts, most of the work was planned for Goddard Space Flight Center. Jack Clark indicated that he would not be able to handle the entire planned workload in FY-70. Several participants proposed that the capabilities of both JPL and MSFC to pick up some of the planned work be carefully investigated. The suggestion was not discarded immediately. ✓

Dr. Allen announced his planned retirement in early November. ✓

B



B 9/23

1. Solar Array System for OWS: In support of the design of this system we are manufacturing 12 structural test substrates (honeycomb panels) 3/8" x 27" x 30" using .008" facesheets and 3.1 lb. per sq. ft. density 1/8" cell core. One ship set (two wings) will require 240 such panels providing 1200 sq. ft. of solar cells. Flat electrical cables will be used for electrical interconnection of panels. ✓
  
2. Development of a Chip Collection System for Zero g Environment: A prototype device was built in our laboratory and successfully demonstrated for collecting chips generated while drilling a hole in a metal structure for use in zero g environment. The device uses compressed gas which flows through a hollow drill bit and flushes the generated chips from the vicinity of the hole and blows them into a filter collection bag. Simultaneously the gas will cool the drill bit and the work area. ✓
  
3. Safety Record: The ME Laboratory has, as of the end of last week, worked 460 days without a lost time accident and 367 days without a government vehicle accident. One contributing factor to this outstanding record, we believe, is the fact that we are not working under such extreme time pressures as in previous years. Basically, of course, this record reflects on the carefulness and safety mindedness of the shop and supporting personnel. ✓✓

B9/23

1. "C" STRUCTURAL TESTING: (Reference Lucas Notes 9-3-68) On 8-21-68, the "C" structure sustained a failure at 122% of limit load during a test of the one-engine-out case with thermal effects included. The damage included buckling of the thrust cone skin, cracking of two stringers, severe bending of eight additional stringers and cracking of one segment of an intermediate ring frame. North American Rockwell (NR) has assessed that to rework the structure to the pretest condition, in every detail, would require 31 weeks. This would involve replacing essentially the entire lower portion of the thrust structure to assure removal of any questionable elements of the hardware. Of course, this plan is completely unacceptable from a cost and schedule viewpoint. As an alternative, NR proposed a "battleship" type of repair that could be accomplished in four weeks. This "battleship" repair would, in our judgement, introduce a "hard-point" in the structure which would cause an unfavorable load distribution and be too great a deviation from the flight configuration. The approach being employed is to repair the local areas of damage as near to the flight configuration as possible, thus accepting minor configuration deviations. NR is providing engineering and manufacturing support in this endeavor. A repair completion date has not yet been determined; however, it is planned to resume testing in early November. ✓
2. SLA/IU TEST: (Reference your comment on Belew Notes 9-3-68) The SLA failure reported has no relation to the AS-502 failure. Unfortunately, nonuniform load was applied during this IU test and caused the inside face sheet of the SLA to buckle just below the load ring. This type of abnormal load distribution to the face sheets would not be encountered in the flight structural configuration. ✓
3. LEM TEST ARTICLE (LTA-B) FOR AS-503: MSC decided to conduct another proof test at KSC to recertify the LTA-B for flight on AS-503. This was completed successfully on 9-16-68; however, after the test, a sander was dropped and dented another strut. This must be repaired, and then MSC may require another proof test. ✓
4. CRYOPROOF TEST OF S-II-6: The cryoproof of S-II-6 was completed successfully at 7 p.m. 9-17-68. There was some insulation damage in the "J" ring area, the extent of which is being assessed by our people. ✓
5. SATURN I ORBITAL WORKSHOP: We participated in last week's McDonnell Douglas Company (MDC) Program Definition Meeting on Saturn I OWS. Such program definition will result in cost reduction/cost avoidance. The key to this activity is to define mutually between program elements and technical elements the program content and then subject this to configuration control. This was expressed by several of the contractor's key personnel and we endorse this wholeheartedly. ✓
6. S-IVB INTERFACE FASTENERS: The cadmium-plated H-11 steel alloy bolts are being changed in the S-IVB interfaces. We have just been notified of a Navy alert relative to embrittlement of H-11 alloy nuts. Failures were experienced in helicopter gear boxes on 1/2, 7/8, and 1-1/8 in. diameter H-11 nuts. Guy Bennett, MDC, was notified of the potential problem and was asked to investigate the S-IVB interfaces which employ 5/16 and 1/4 in. diameter nuts. ✓
7. SHORT STACK TEST: Wyle Laboratories is approximately 28-days behind the original schedule. Computer problems and trouble shooting of the data system continue to pace the program. ✓

B  
9/23

AERONAUTIC ASTRONAUTIC CO-ORDINATING BOARD (AACB) COMPARISON OF SATURN IB/TITAN IIIM: Dr. Newell, NASA, and Dr. Foster, DOD, the Co-Chairmen of the AACB, have requested Messers. Rosen, NASA, and Flax, DOD, Co-Chairmen of the Launch Vehicle Panel (LVP), to make a study of the family of launch vehicles that can meet present and future manned and unmanned missions needs of both agencies. The LVP plans to make a technical and cost comparison of data for the Saturn IB and the Titan IIIM. They will also study technical and cost data for the intermediate class vehicles. ✓

The current plan is to use the data collected by Chrysler Corporation Space Division for the National Space Booster Study for the Saturn IB input since it is essentially in the desired format. ✓

It is interesting to note that while we are in the process of terminating Saturn IB production, higher levels of NASA and DOD are still interested in making such comparisons. ✓

NATIONAL SPACE BOOSTER STUDY (NSBS): Chrysler has completed their efforts for the NSBS with respect to the Saturns. Presentations of the final results are being made to the various contractor executives the week of September 23. The Titan IIIM data was received too late for inclusion in this presentation. On October 3, the same presentation will be made to Mr. Webb, Dr. Paine and Dr. Rees. ✓ The Center Directors of MSFC and KSC will probably be invited. ✓

The presentation will include the following major areas:

1. Current program and projected vehicle costs (projections are 2 x 2 and 4 x 4 production rates).
2. Cost reduction changes to the vehicle configurations.
3. Programmatic changes and consolidation of operations. ✓

We understand Chuck Mathews is considering expanding the Chrysler scope of work to include more analyses in depth. We are maintaining contact with Dan Schnyer, MSF, to follow this activity. ✓

B  
9/23UAH SEPARATION STUDY BRIEFINGS

In the Notes for September 3, mention was made of General Eifler's expressed concern over alleged planned moves by Beirne Spragins to seek greater autonomy and recognition for UAH, by direct confrontation with the Board of Trustees.

My discussions with Beirne indicate that such concerns are groundless. Beirne states flatly that complete autonomy is not now and indeed may never be desirable. Similar views with varying degrees of emphasis have been voiced to me by Senator Jack Giles and Clyde Reeves.

Computation Laboratory assistance has been given Alabama A&M in activating the IBM 360 equipment. Clyde Foster has been on-site for some time even though the MSFC - A&M cooperative work agreement has not yet been signed. This presents no great problem - the concept is highly acceptable.

Information was received that certain undergraduate credits earned at UAH were being rejected by the main campus. Clyde Reeves asserts that this matter has been closed satisfactorily by means of a strong policy statement from the Vice President for Academic Affairs. However, certain courses acceptable for an advanced degree on one campus are not necessarily acceptable on the other campus. This interesting state of affairs stems from the autonomous relationship of the two institutions. ✓



B  
9/23MSC Short Stack Structural Tests at Wyle Laboratory:

As you know, the short stack structural tests are being conducted here at Wyle Laboratory for MSC. P&VE had been requested by MSC to support this effort and their contribution has been far greater than initially planned.

I received an alert from P&VE concerning safety of the total short stack testing program at Wyle. After investigation we found proper reason for such concern. Many unsafe practices were in evidence, for example: no fire extinguishing equipment was available; a test plan and detailed test procedures had not been written, etc. Although this testing is not an MSFC direct responsibility, P&VE and this office recognized the indirect responsibility in the event of an accident. ✓

Through concerted pressure by Mr. Griner (P&VE) in his daily relations at Wyle and our personnel visits to Wyle, as well as telephone calls to MSC, we now feel that this aggravated safety problem has received proper attention. Water and CO2 extinguishing systems are available around the clock; detailed test procedures are being written; the housekeeping practices have been improved; and access to the structure is carefully controlled. We can thank P&VE for their special attention to this problem for we certainly cannot afford an accident due to lack of Safety attention at this time in the program. ✓

Bill Lucas

Thaux

B

NOTES 9/23/68 RICHARD

B  
9/23

C' Mission Timelines: A presentation on C' mission timelines will be made to the prime and backup crews at KSC on October 8, 1968. Emphasis will be on orbital operations. The presentation will be covered by representatives of Astrionics, P&VE, Aero-Astroynamics, and Systems Engineering Office. ✓

B 9/23

1. AS-205 CDDT Hold History: During the terminal count of the AS-205 Countdown Demonstration Test (CDDT), there were two non-scheduled holds during the wet and three non-scheduled holds during the dry test totaling 7 hours and 17 minutes and 80 minutes respectively. The problems experienced which caused the holds were as follows: Two spacecraft, three KSC facility, one KSC procedural and two launch vehicle GSE (S-IVB Bulkhead Cavity Vacuum Pump Failure, LVDC/RCA-110 GSE peripheral power supply failure). According to MSC's Recovery Division, launch abort wind simulations during the CDDT had the following results; balloon release at T-7 hours and 15 minutes and at T-5 hours: land impact from T+9 sec. to T+41 sec.; at T-1 hour: land impact from T+1 sec. to T+41 sec. ✓

2. Apollo 7 Mission Support Review (MSR): A final review of mission support with all NASA and DOD support agencies was held at KSC on 9/17. The only major problem was the wind data transmission from KSC to MSC for launch abort wind simulations; transmission difficulties had caused delays in wind reports during the CDDT. ✓

3. AS-205 Ground Winds Constraint: Despite increased MSFC effort, we have still experienced problems in adequately defining the ground wind constraints on AS-205. Although the matrix of vehicle countdown conditions for which 205 limits were generated had been previously accepted, Petrone requested again more detailed data during LOX load. This resulted in a rush effort by P&VE to generate the data before CDDT. In generating this data, another deficiency in the wind limits during LH<sub>2</sub> loading was detected too late to provide complete analysis for CDDT. It appears that in order to be accurate we will have to key our limits still more specifically than before to the exact countdown procedures (rather than analyzing limit cases), although this creates more load on R&DO and makes us more susceptible to KSC procedural changes. We also still need earlier review by KSC operations management of the wind data being provided. We will continue to work this problem area. ✓

4. Personnel: Bill Hynes, who for over two years has been our Operations Support Requirements Office (OSRO) representative at Headquarters, is being transferred to the Headquarters Mission Operations Office effective 9/21/68. His responsibilities will be handled from here in the future in keeping with the new concept of having Center representatives remain at their respective Centers. ✓

5. MSC Apollo 7 Mission Operations Review: MSC (Kraft) held an Operations Review of Apollo 7 on 9/18. Due to previous commitments I could not attend and Scott Hamner, Manager of the MSFC Flight Control Office, presented the launch vehicle portion. ✓

B  
9/23

1. CONTAMINATION FLIGHT EXPERIMENT: The engineering models for TO27 (photometer, camera, and sample array), will be at the SSL Conference Room on the afternoons of October 1 and 2. Mr. Sawyer and Dr. Muscari of Martin/Denver will be available for discussing the experiment status at those times. An introduction and status review will be presented to MSFC on October 2. ✓

2. BALLOON FLIGHT: The gamma ray experiment (Dr. Gibbons) with ORNL has been checked out in the environmental chamber in Test Laboratory. No trouble was encountered. Present plans are to leave for Palestine, Texas, on September 30, 1968. Approximately seven days will be required to check and calibrate the experiment at Palestine before it will be ready to be launched. ✓

The objectives of the balloon flight are twofold: (1) To measure gamma rays with the shielded germanium-lithium detector to determine the effectiveness of the shield, and (2) to pulse-height analyze the signals from the scintillation plastic (NE 103) which is used in an anti-coincidence circuit. This analysis will determine the energy distribution of charged particles impinging upon the instrumentation. ✓

3. METEOROID TESTING: Mr. John Howard from JPL contacted us requesting a series of tests for the meteoroid protection on Mariner '71. Mr. Espy and Mr. Jex will perform this work, beginning in mid-October, in the light gas gun range in which we also conducted the workshop bumper testing for P&VE. ✓



B 9/23

SA-205 STATUS: The Flight Readiness Test is scheduled to start Tues. 24 Sept. and be completed Thurs. 26 Sept. We know of no launch vehicle or spacecraft problems that should delay this test. All CDDT problems and open work should be closed out prior to the start of FRT.

Concerning CDDT problems, we will revert to the original lubricant for the S-IVB bulkhead vacuum pump and remove or increase the size of a 10 amp. circuit breaker on the pump motor (6 to 7 amps. normal). A new lot of amplifiers on the S-IB Stage LOX seal drain line temperature measurements appeared to oscillate on several of the circuits. Complete failure analysis and testing is being performed and we are changing out all of the new lot amplifiers (a total of 8) with tested spares from earlier purchases. One other failure occurred in an amplifier from an old buy. CCSD believes this is a random failure. A detailed failure analysis started at Michoud Sat. and we should have a position prior to the FRT.

We have also decided to change out the Range Safety Decoders in S-IB and S-IVB Stages. Astrionics failure analysis of the unit that failed on the LC-39 LUT has verified that all decoders between Serial #30 and #181 have silicon control rectifiers that are susceptible to failure due to contamination caused by deterioration of a silicon rubber coating. This contamination is age dependent and is accelerated by high-temperatures. The units prior to Serial #31 and subsequent to #180 have silicon control rectifiers produced by a different process and do not contain the silicon rubber. All replacements have serial numbers above 180 and have been given a 20 hour elevated temperature test. Tom Barr, R-ASTR, is at KSC today to give KSC and Eastern Test Range technical personnel a detailed briefing on the problem. ✓

SA-205 FLIGHT CONTROL COMPUTER: Because of the suspected relay failure in the SA-503 Flight Control Computer we examined the effect of such a relay failure on the SA-205 mission. The only critical effect on the SA-205 vehicle would be loss of the control accelerometer input. Astrionics has simulated the loss of the Control Accelerometer inputs and found the vehicle upper air wind capability is reduced from maximum vehicle design by about 15% from approximately 72 m/sec. to 60 m/sec. As for engine out capability, the results were about the same as for winds. R-ASTR-F found no particular reason for concern over loss of Control Accelerometer inputs. ✓

S-IB-7 H-1 ENGINE DAMAGE: Last week Bill Brown, I-E-MGR, reported the LOX pump inducer blades on an S-IB-7 Stage engine had been damaged by foreign material going through the pump. We have not yet found the foreign material. The engine is being removed from the stage and will be made available to Rocketdyne today for teardown. The system has not been opened since static test so whatever did the damage apparently went through the pump during static test. ✓

B 9/23

1. OASF Presentation to Senate Committee Staff: Several weeks ago the OMSF-MT organization (Doug Lord's Shop) was contacted by a member of the Senate Space Committee staff and requested a briefing on the Orbital Astronomy Support Facility Study (OASF). Jean Olivier, the MSFC-COR, was contacted and asked to make the presentation. Shortly after that the briefing was indefinitely postponed because of a schedule conflict on the part of the Senate Committee Staff.

Last week Jim Gehrig, Chief of the Senate Committee Staff, contacted Mr. Redway, a McDonnell-Douglas Vice-president located in Washington, and requested a briefing on the OASF study. It was agreed that the briefing should be held at Jim Gehrig's office at 10 a.m. on September 17, 1968. Mr. Redway then contacted someone in OMSF-MT and informed them of the request and it was decided that a dry run should be conducted to the MT organization on September 16.

The MSFC-COR was contacted by Dr. Harry Wolbers, the McDonnell-Douglas OASF study manager, and informed of the request from Jim Gehrig and asked to attend the briefing.

The dry run was conducted on September 16 with Doug Lord (MT) and several of his people attending. Doug was generally unaware of how the briefing had been arranged, or why Jim Gehrig was interested in the OASF study. He called the Legislative Affairs Office and asked that they send someone to the dry run.

The dry run presentation was given by Dr. Harry Wolbers of McDonnell-Douglas. The presentation went well, with only minor changes suggested by MT. It was decided that Jean Olivier, the MSFC-COR, should give a brief introduction and that Dr. Wolbers would make the technical presentation.

The NASA attendees to the Senate Committee Staff presentation on September 17 were Jean Olivier, MSFC; Dr. Harry Hall, MT; Mr. Mark Aucremanne, OSSA, and Jack Cramer from Legislative Affairs. About five (5) of the Senate Space Committee Staff attended, including Jim Gehrig. As it turned out, Jim Gehrig was primarily interested in the question of justification of man's role in space astronomy. He was looking for someone to prove that man was an essential part of the mission.

Although Dr. Wolbers did a good job on the presentation, the basic question of justifying man's role was never answered to Jim Gehrig's satisfaction. Although the OASF study generally analysed man's role in space astronomy, it was not basically scoped to prove that man was essential for mission success. Jim Gehrig was of the opinion that astronomy was one of the more important and natural scientific areas for space missions, however, he said that they existed, both within NASA and within the scientific community, a difference of opinion concerning man's role and that he was simply trying to arrive at an answer. ✓

Sept. 30, 1968

168. MR. G. - 2/20mm

NOTES  
MR. GORMAN'S COPY  
SEP 30 1968

*with comments*

*Geissler and James notes  
marked for Mr Gorman  
—  
(have been answered)*



NOTES

2394

~~direct~~ 10/9 9/85  
B 10/14  
10-18  
2.10/21

R-AERO-DIR

Dr. E. D. Geissler

This is in connection with your "Notes" of 9-30-68. I have been asked by Wernher to check into the Computation Laboratory support problem a little further. Dick Cook tells me that this matter has been given a great deal of attention and additional funds will be applied for a third shift and for overtime, if it is abundantly clear that the overtime and third shift are needed for the priority work.

If I understand your note correctly, the highest priority work on the 205 and 503 missions is being performed but other work of lesser priority is being delayed. As you are well aware, we are in a bind for funds to support the CSC operation and must make every effort to avoid overtime and third shift unless the backlog is unacceptable. Therefore, I would like a little more information on the nature of the work that is being delayed and, specifically, its impact on the laboratory mission. I believe that a reasonable backlog provides the best economic base for operating the computation system and we should make every effort to accommodate reasonable delays and turn around time.

Information copy - DIR



2.

Ed O'Connor has advised me today that Boeing has requested an additional IBM 360 through June 30 of next year. This is apparently needed to provide the capability for alternate mission planning. Is there a relationship between this requirement and your comments on the Computation Laboratory not having the programming capability to support the conversion of the targeting program to the 1108 computer?

DEP-A

H. H. Gorman

10-2-68



1. AS-503/C' Mission Activities: Translunar injection targeting (variable azimuth) and verification trajectories of the AS-503 launch vehicle for the December window C' mission were completed by Boeing on 9/23/68. A preliminary operational trajectory report was put into distribution on 9/25/68, one day behind our originally planned schedule. Required working information, including guidance presettings, was delivered to Astrionics and to MSC on schedule. The pitch attitude for the S-IVB propellant dump (slingshot) after CSM separation was selected to be 180 deg from the local horizontal. This is the optimum attitude for CCS communications. MSC is also satisfied with the dump attitude with respect to CSM avoidance. However, for the nominal case of propellant dump, which will impart a velocity impulse of approximately 28 m/sec, the S-IVB/IU will impact the moon. Missing the moon was a third priority objective after spacecraft avoidance and non-earth return. We had not been planning to do lunar targeting until AS-505. This milestone for AS-503 C' was reached due to some extraordinary work on the part of Boeing and our own civil service personnel. ✓ Boeing has been working essentially a 24-hour a day, seven-day week operation to support this effort. Mr. Moore at Boeing has led the targeting and operational trajectory effort. Civil service lead individuals were Messrs. O. Hardage and G. Wittenstein. ✓
2. Computation Laboratory Support: Computation Laboratory has eliminated the use of the IBM 7094 computers on weekends. Indications are that a further reduction in 7094 computer usage is planned, such as elimination of the third shift. We do not feel that this Laboratory can afford this reduction in Computation support. The loss of computer support necessitates that we run only the highest priority work which means that the AS-205 and AS-503 C' Missions consume almost 100% of our available computer time. This procedure is already beginning to strangle the normal non-urgent workload that is required for future missions. It requires up to two weeks to get a production run back on non-priority jobs. In addition, our demands for support of launches, studies in support of NASA Headquarters requests, and support of other Centers are not only more numerous but are becoming more complex. The Computation Laboratory has been requested to convert Boeing's lunar targeting computer program to the 1108 system to provide an MSFC in-house capability for rapid response targeting. Now we are totally dependent on Boeing with no means to verify what they are doing. We expect that rapid reaction for mission changes will become a way of life in the future and this type of support may be impractical to get out of Boeing. An informal response from Computation Laboratory indicated they did not have the programming support to support the conversion of the targeting program to the 1108 computer. In addition to these problems, Computation Laboratory's results for Lockheed and Northrop are deteriorating. Computer turnaround time is continuing to increase due partly to operating errors and machine failures. For example, for our Dynamic and Flight Mechanics Division, in August, of the ≈ 190 IBM 7094 runs made, twenty-seven runs experienced machine failure or operator error, resulting in a lost run or severe delay. Based on 178 runs of 10 minutes duration or less, average turnaround time was 32 hours. Average turnaround time increased from 20 hours in June to 25 hours in July to 32 hours in August. This problem is common to other Divisions in the Laboratory as well.
3. Longitudinal-Lateral Coupling on AS-502: Many questions have arisen with respect to the interpretation of the results of our simulation study of the longitudinal-lateral coupling observed on AS-502. We would welcome the opportunity of giving you a detailed presentation of our simulation results with appropriate interpretation. The presentation, with questions, would take approximately one hour.

Harry G.

I guess  
it's

mandatory

to relax

some of

our out-

back

measures

in this

area. This

kind of

situation

can become

a most

danger

to the

Apollo

program.

B

10-1

4



1. AS-503 Roll-out: AS-503 roll-out, scheduled October 8 and assessed as October 12, will not conflict with AS-205 launch and will proceed independent of AS-205 activities.
2. S-II-6 Static Firing: The static firing of S-II-6 has been rescheduled from October 1, 1968, to October 4, 1968, to permit removal of the LOX sump baffles in order to verify the S-II-3 configuration by the firing. ✓
3. LH<sub>2</sub> Tank Pressure Abort Cue (low NPSH): MSC informed us at the Crew Safety Panel Meeting on September 25, 1968, that George Low, with the concurrence of D. Slayton and C. Kraft, decided not to use the LH<sub>2</sub> tank pressure measurement as an abort cue for AS-205. MSFC did not agree with this for either the AS-205 or the AS-503 mission. MSC has not stated their position on AS-503, but is sending out a TWX stating their rationale for this decision on AS-205. We will follow-up in conjunction with Dr. Speer's office. LBJ  
My understanding was that MSC rejected the spacecraft tank pressure as a reliable cue, and instead is depend on telemeter link and abort cues from the ground. Is that no longer correct?  
R
4. IU Structural Insulation: On September 27, 1968, P&VE proposed to insulate the IU and remove the channels on its outside for AS-505 and subsequent. Insulating the IU would give a safety factor of 1.36 and replacing the channels with X-306 damping compound would bring the safety factor to 1.60. This requires elimination of planned IU heating during the tests at Wyle scheduled for this week. Some technical problems, e.g. cork or spray-on insulation, and schedule impact are expected to be resolved this week. No changes are anticipated for IU-503 and IU-504. ✓
5. MSFC In-flight Support for C' Mission: We have been informally approached by MSC on possible MSFC support in evaluating orbital insertion and coast conditions and giving a go - no go decision for Spacecraft TLI for the C' Mission. Such support would involve computer and manpower resources beyond anything we have done or planned in support of flight operations. To assure that we do not divert resources already strained to the limit, Fred Speer will chair a group composed of representatives from R&DO and my office to determine the support that MSFC could commit to MSC without jeopardizing the on-going program. We will report to the MSFC Board Meeting on October 11, 1968. ✓

Harry  
Gorman

This  
(may be  
very  
good)

Plan would further  
aggravate our ComLab

problem B 10-1



2821

B 11/19 ~~dist~~ 11/18 JS  
11-22 / 11-22 NOTES

GEORGE C. MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, ALABAMA

## Memorandum

TO Dr. von Braun, DIR DATE NOV 7 1968

FROM Director, Quality and Reliability  
Assurance Laboratory, R-QUAL-DIR

SUBJECT Misalignment of S-II stage engines

1. Reference is made to your comments to Dr. Lucas' notes of September 30, 1968. Copy is enclosed.

2. An on-site evaluation of S-II stage alignment was conducted by two engineers of this Laboratory during the week starting October 7, 1968. The following findings are based on information obtained during this and earlier investigations. To date, there have been two basic alignment verification methods utilized. The first was barely adequate; however, the current method which has been utilized on S-II-7 and subsequent stages is very good.

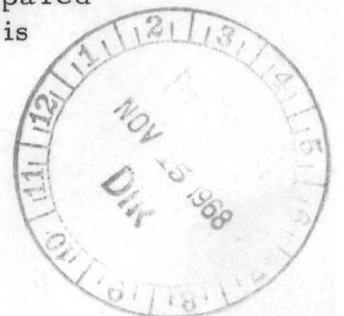
3. Summary by stages

a. S-II-3 stage

Two of the outboard engines on S-II-3 are slightly out of tolerance due to an inadequate thrust structure assembly fixture which has been corrected starting with S-II-8. Due to an oversight, the data on S-II-3 was not officially approved but is now being prepared for submission to MSFC on a Specification Change Notice. It is expected that this data will not result in hardware change since it has been submitted to the P&VE Laboratory and unofficially concurred in.

b. S-II-4 stage

All outboard engines on S-II-4 are somewhat over tolerance - the worst case being 63 per cent over. Due to an oversight, the data on S-II-4 has not been officially approved but is now being prepared for submission to MSFC on a Specification Change Notice. It is



expected that this data will not result in hardware changes since it has been submitted to the P&VE Laboratory and unofficially concurred in.

c. S-II-5 stage

This stage is within tolerance at all engine positions.

d. S-II-6 stage

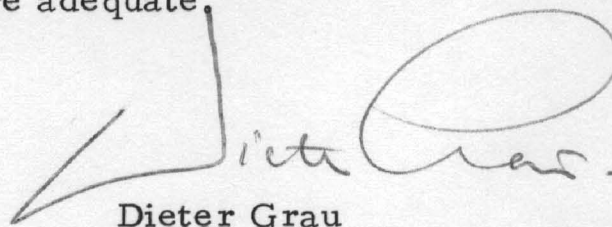
The method used by NAR for determining the location of the gimbal block attach points was again barely adequate. After analyzing and massaging inadequate data presented by NAR, we believe we know the location of the attach points with sufficient accuracy. Our analysis shows that the engine misalignment is less than that previously stated by NAR. Even with the NAR values, P&VE, ASTR, and AERO do not require engine realignment.

e. S-II-7 stage

All but one engine position on S-II-7 is out of tolerance - the worst case being 114 per cent over. This data was earlier approved on a Material Review Board action which was concurred in by this Laboratory and P&VE Laboratory. Therefore, no hardware changes are required.

4. Alignment procedures

Alignment procedures are not presently required to be submitted to MSFC even though they were earlier requested. Action has been initiated to have all alignment procedures submitted. We now believe that their procedures are adequate.



Dieter Grau

1 Enc:  
a/s

cc:  
See page 3

cc:

I-DIR, Gen. E. O'Connor

R-DIR, Mr. H. Weidner

I-V-S-II, Mr. J. Stone

R-P&VE-DIR, Dr. W. Lucas

R-P&VE-XSH, Mr. A. Gresham

R-AERO-DIR, Dr. E. Geissler

R-AERO-P, Mr. P. Hoag

R-ASTR-DIR, Dr. W. Haeussermann

R-ASTR-NFM, Mr. J. Lominick

R-QUAL-J, Mr. T. McMinn

R-QUAL-AE, Mr. J. Richardson



BK-1

1. AAP MECHANICAL PANEL: The sixth AAP Mechanical Panel meeting was held 9-26-68 at MSFC. The main activity was baselining ICD's. All AAP-2 ICD's will be forwarded to the Panel for baselining by the first week of December 1968. All AAP-4 ICD's will be forwarded to the Panel for baselining by the first week of February 1969. All AAP Experiment ICD's will be forwarded to the Panel at two week intervals beginning with T027 on 10-15-68, with completion by 2-1-69. Revisions to Apollo ICD's will be submitted by first week of December 1968 to include AAP-1, 3, 3A missions. ✓
2. S-II BASE HEATING: S-II-6 engines are misaligned to such an extent that we question the capability of the heat shield under these conditions. The engines on S-II-3 are out-of-specification in alignment but are not to the extent to cause alarm. S-II-5 and S-II-7 are within specification but were measured by a different system. Thus, the true location of the S-II-6 engines is questionable, and R-QUAL Lab has been asked to follow up and develop an engine alignment procedure.
3. POGO: To provide added confidence in the recently revised fuel feedline frequency data, which were based on four static firing results, we have scheduled four more fuel pulsing tests, beginning 9-30-68. These tests will also have improved chamber pressure and pump discharge pressure dynamic measurements which are required to verify the F-1 engine fuel transfer function. In addition, baseline fuel pulsing tests on the inboard and outboard fuel feedline configurations will be run on the F-1 turbopump test stand on 9-30-68 and 10-2-68 respectively. The objective of these tests is to evaluate possible inboard and outboard fuel PVC compliance differences which could result in different resonant frequencies for the two configurations. ✓
4. S-IC STRESS CORROSION FAILURE: A 7079-T6 die forging, used as a cruciform baffle support, was found cracked in the S-IC-507 LOX tank. This part has high residual stresses and up to 28 ksi assembly stress in the long transverse grain direction. This item was identified by TBC as a Category 2 item on the stress corrosion survey which means "failure of this part, due to stress corrosion, compromises mission accomplishment." TBC proposed to defer corrective measures on 132 Category 2 items until after 61 Category 1 items were corrected.
5. S-IC CORROSION: Excessive corrosion has been found on the S-IC-512 LOX tunnels subsequent to hydrostatic test. Corrosion, attributed to inadequate anodize treatment, has also been found on those LOX tunnels in storage. Personnel at Michoud report that there have been no changes in the anodize treatment.
6. LM/ATM PDR CONTROL & DISPLAY PANEL STATIC SIMULATOR REVIEW: As part of the LM/ATM PDR Crew Station Working Group on 9-25-68 and 9-26-68, MSC astronauts participated in a crew evaluation of the control and display panel systems operations and integrated experiment operations. Each astronaut (Garriott, Gibson, Weitz, and McCandless) spent 4 hours in the static control and display panel simulator at R-COMP Lab going through the procedures generated by our Human Factors people. The astronauts requested an additional 2 days to continue this work now tentatively scheduled for 10-14-68 and 10-15-68.

Dieter  
Graw  
How is  
that  
possible?  
B

1.0.  
CSat V  
Manager  
Please  
consult  
B

Sub Let's visit this place  
B

Enc. 1



NOTES 9/30/68 BALCH

B<sub>10-1</sub>

MISSION:

S-II-5 - Because of new modification requirements, removal of stage from Vertical Checkout Building and reinstallation in the A-1 Test Stand has been rescheduled from 10/4/68 to 10/8/68. ✓

S-II-6 - Static firing, previously scheduled for 10/1/68, was rescheduled to 10/4/68 because of requirement to enter LOX tank to remove LOX sump baffles but is now targeted for 10/3/68. ✓

S-IC-7 - "Power-up" is still scheduled for tomorrow, 10/1/68. Based on request of the S-IC Stage Office, MSFC, static firing has been rescheduled from 10/22/68 to 10/23/68. ✓

INSTALLATION:

1.0. → BOMEX - Lack of complete program authorization has placed consummation of contract in jeopardy. Negotiation progress with GE is on schedule.

?? B University Research - Meetings are scheduled for 10/1/68 and 10/2/68 at MSFC to discuss with Louisiana State and Mississippi State Universities the specific research activities they will undertake at MTF, for which \$200,000 has now been programmed by MSFC. Personnel of both universities will attend the meetings at MSFC. ✓

Civil Defense - On 9/23/68, MTF Base Operations personnel met with various architect and engineer representatives from the Gulf Coast area to organize a Civil Defense Fall-out Shelter analysis course sponsored by the National Society of Professional Engineers in cooperation with the Biloxi, Mississippi, Civil Defense Office and the Department of the Army. The course will consist of 13 weekly evening meetings and will be conducted by Professor Edward Springer of Mississippi State University. ✓

GENERAL:

Lawsuits in Connection with NASA Barge Collision in Florida on 9/16/66 - Mr. John C. Matthews, from MSFC Chief Counsel's office, was in this area during the past week in connection with U. S. Government and State of Florida lawsuits against Gulf Coast Towing Company for damages resulting from the collision of a NASA LOX barge with the Alva, Florida, bridge on 9/16/66. Two MTF representatives, one from Contracts and one from Safety gave depositions relating to the case in New Orleans on 9/26/68. ✓

AAP BASELINE MEETING: We had a meeting with Mr. Luskin, Mr. Thompson and representatives of KSC on September 26, to review several open items relative to the AAP missions and hardware configurations. The following significant baseline decisions were made:

1. Reduce the Saturn I Workshop orbit to 210 NM.
2. MSFC and MSC will work a flight mechanics scheme for AAP-2, which includes insertion into an elliptical orbit, utilization of engine dump passivation and CSM/RCS to circularize the Workshop in order to improve the AAP-2 performance.
3. Change the cluster orbital inclination from the current  $29^{\circ}$  to approximately  $35^{\circ}$ .
4. Baselined a list of 24 experiments for AAP-2.
5. Baselined the retention of MDA docking port number 4.
6. Concurred in the MSFC proposal for a lightweight Saturn I Workshop solar array.
7. The bio med experiments will be moved to the Saturn I Workshop after initial operation in the MDA. ✓

In addition to the above, MSFC and MSC recommend that suborbital burn of the CSM/SPS be used for orbit insertion on the manned flights. Mr. Luskin delayed a decision on this item pending some additional information relative to potential range safety problems associated with land impact of the CSM under certain conditions.

SUB? B

ATM PRELIMINARY DESIGN REVIEW (PDR): The ATM PDR was successfully completed September 19. Approximately 135 Review Item Discrepancies (RID's) were submitted. These RID's will be typed, reproduced, and distributed before the ATM PDR pre board meeting scheduled October 3. The board meeting is scheduled for October 4. ✓

H-1 Engine - Damage on AS-207 - Reference my Notes of 9-25 concerning a foreign object which was ingested by Engine H-7077 (position no. 1 on SA-207). Disassembly revealed that a stainless steel cap screw (1/4 " x 20 threads per inch) had gone through the LOX pump and lodged on the back face of the injector. The cap screw is like the one removed from Engine H-5019 in August 1964, (position no. 1 on Saturn I vehicle 8). In both instances there was no noticeable performance decrease and the damage was discovered at a later disassembly. However, there is a limit to what the engine can digest and the hard facts are that each such occurrence markedly increases the possibility of a fire. We have been indeed fortunate to have escaped without having had a fire in either of these incidents. The following action is in progress:

a. CCSD and Rocketdyne are searching for the sources of these cap screws and probable method of entry into the vehicle LOX system. A suspense date of October 1 has been set for a progress report, in view of any possible impact to the AS-205 launch.

b. MSFC personnel (R-P&VE and R-TEST) are investigating possible sources and methods of entry.

c. The LOX pumps of all engines on AS-205 were inspected in the process of the bellows LOX seal retrofit. There was no evidence of a similar problem. ✓

J-2 Engine - During the Flight Readiness Test on AS-205, the J-2 Engine helium bottle pressure decayed from 1500 psi to Zero psi in 50 seconds. An investigation revealed that the helium regulator had failed, providing a leak path for the helium bottle. The failed regulator has been returned to Rocketdyne and the failure analysis is underway. Representatives from the Qual Lab, P&VE, and EPO will participate in the failure investigation. The regulator was replaced with a spare unit and all leak checks have been completed. ✓

Use of Surplus Equipment - As a part of the retrenchment at Rocketdyne, two pieces of surplus equipment have been identified for shipment to MSFC. They are:

a. A 30,000-pound force vibration exciter (shaker table), complete with amplifier and controls, for P&VE Laboratory.

b. A numerically controlled milling machine (profile and contouring) for ME Laboratory.

The shaker is scheduled to arrive at MSFC today. The milling machine is to be available by January 1969. ✓

B<sub>10-1</sub>

UNITED FUND CAMPAIGN

97% of Michoud employees contributed to the United Fund for the Greater New Orleans area. ✓

POTENTIAL LABOR DISPUTE

The current labor agreement between The Boeing Company and the International Association of Machinists expires at midnight, October 2, 1968. Although negotiations are currently being conducted in an effort to resolve areas of dispute, there is a definite possibility that a strike could result the morning of October 3, 1968. In the event of a strike, a separate gate for the exclusive use by The Boeing Company employees will be designated in order that other contractors performing at Michoud will not be affected. ✓



1. AS-503/C' Mission Activities: Translunar injection targeting (variable azimuth) and verification trajectories of the AS-503 launch vehicle for the December window C' mission were completed by Boeing on 9/23/68. A preliminary operational trajectory report was put into distribution on 9/25/68, one day behind our originally planned schedule. Required working information, including guidance presettings, was delivered to Astrionics and to MSC on schedule. The pitch attitude for the S-IVB propellant dump (slingshot) after CSM separation was selected to be 180 deg from the local horizontal. This is the optimum attitude for CCS communications. MSC is also satisfied with the dump attitude with respect to CSM avoidance. However, for the nominal case of propellant dump, which will impart a velocity impulse of approximately 28 m/sec, the S-IVB/IU will impact the moon. Missing the moon was a third priority objective after spacecraft avoidance and non-earth return. We had not been planning to do lunar targeting until AS-505. This milestone for AS-503 C' was reached due to some extraordinary work on the part of Boeing and our own civil service personnel. ✓ Boeing has been working essentially a 24-hour a day, seven-day week operation to support this effort. Mr. Moore at Boeing has led the targeting and operational trajectory effort. Civil service lead individuals were Messrs. O. Hardage and G. Wittenstein. ✓

2. Computation Laboratory Support: Computation Laboratory has eliminated the use of the IBM 7094 computers on weekends. Indications are that a further reduction in 7094 computer usage is planned, such as elimination of the third shift. We do not feel that this Laboratory can afford this reduction in Computation support. The loss of computer support necessitates that we run only the highest priority work which means that the AS-205 and AS-503 C' Missions consume almost 100% of our available computer time. This procedure is already beginning to strangle the normal non-urgent workload that is required for future missions. It requires up to two weeks to get a production run back on non-priority jobs. In addition, our demands for support of launches, studies in support of NASA Headquarters requests, and support of other Centers are not only more numerous but are becoming more complex. The Computation Laboratory has been requested to convert Boeing's lunar targeting computer program to the 1108 system to provide an MSFC in-house capability for rapid response targeting. Now we are totally dependent on Boeing with no means to verify what they are doing. We expect that rapid reaction for mission changes will become a way of life in the future and this type of support may be impractical to get out of Boeing. An informal response from Computation Laboratory indicated they did not have the programming support to support the conversion of the targeting program to the 1108 computer. In addition to these problems, Computation Laboratory's results for Lockheed and Northrop are deteriorating. Computer turnaround time is continuing to increase due partly to operating errors and machine failures. For example, for our Dynamic and Flight Mechanics Division, in August, of the  $\approx$  190 IBM 7094 runs made, twenty-seven runs experienced machine failure or operator error, resulting in a lost run or severe delay. Based on 178 runs of 10 minutes duration or less, average turnaround time was 32 hours. Average turnaround time increased from 20 hours in June to 25 hours in July to 32 hours in August. This problem is common to other Divisions in the Laboratory as well.

3. Longitudinal-Lateral Coupling on AS-502: Many questions have arisen with respect to the interpretation of the results of our simulation study of the longitudinal-lateral coupling observed on AS-502. We would welcome the opportunity of giving you a detailed presentation of our simulation results with appropriate interpretation. The presentation, with questions, would take approximately one hour.

Harry G.  
1 guess  
it's  
mandatory  
to relax  
some of  
our out-  
back  
measures  
in this  
area. This  
kind of  
situation  
can become  
a mortal  
danger  
to the  
Apollo  
program.

B  
10-1

QUALITY SURVEYS: We have recently compiled 782 observations and discrepancies resulting from 33 surveys (27 by MSFC and 6 by NASA Headquarters) of our six stage/engine prime contractors during the period June 21, 1966, through July 1968. Of special note is the number of problems found in failure reporting and corrective action areas. Although the contractors have made significant improvement in these areas, there is still a need for continuous emphasis and surveillance of their failure reporting and corrective action programs. The top few observation/discrepancy areas found during surveys: Failure reporting and corrective action - 214; Inspection - 94; Testing - 75; Calibration - 61; Procurement - 52; Time/Cycle and Age Control - 47; Fabrication and Assembly - 39; and Clean Room - 35. ✓

1. Secure Range Safety Decoders, SA-205 and 503. Failures of these decoders have been attributed to a contamination process related to aging of the silicon controlled rectifiers (SCR) in the decoders. The units on SA-205 and 503 are being replaced with SCR's not subject to this contamination effect. Captain Alongi, the Range Safety Officer, considers that the change will insure safe launches. ✓
  
2. ATM PDR. The ATM PDR proceeded very well last week. There was a total of 135 RID's written but many of them covered no design impact statements such as inaccuracies of documentation. We will report more detail after the preliminary review board has screened each of the RID's.\* Concurrent with the PDR, the astronauts had a crew station review of the Control and Display Console in the Computation Lab. Some good comments were made and none of the comments were of the nature to cause a significant design impact. ✓
  
3. Flight Battery Lifetime Extension. We have extended the stay time of the activated batteries from 72 hours to 120 hours. The IO Program offices requested (memo attached - copy to Dr. von Braun and Mr. Weidner only) that we make investigations to further extend lifetime to 240 hours. We have contracted with Eagle-Picher to support us in this investigation. To get practical data, we used the activated spare batteries from the 205 CDDT. We trucked them from KSC to Huntsville and performed vibration tests at Wyle Lab. These tests were finished on Friday 27 September. After the tests, they were brought to the Astrionics Environmental Test Facility at 3:30 PM for discharge. Because of curtailed operations within the Lab on weekends, the subject batteries remained crated to await discharge tests Monday morning. Preparation for the Open House further curtailed the operation. Unfortunately, around 8:15 PM, the largest battery for the IU developed an internal cell short and overheated the battery resulting in a battery fire. The remaining five batteries were brought to a reinforced place and on Saturday all five batteries were discharged to eliminate possible hazardous conditions. In the meantime, we have established a technical investigating committee which will furnish you a complete detailed report. All the results so far show that there is no relation whatsoever that this happening has anything to do with the worthiness of our present battery hardware because the present 120 hour stand limitation imposed at KSC had been exceeded by approximately three times. This matter has been closely coordinated with the Director of Safety and he concurs in this note. ✓



ACCESS ARM NO. 9 (AA-09-01) Acceptance testing of the AA-09-01 Access Arm was successfully completed on 9/24. The arm, hinges, environmental chamber, accumulator rack, and control console No. 1 were removed from the tower and turned over to Boeing on 9/27, which is about two weeks ahead of the 10/13 schedule date for delivery. The next arm (AA-09-02) is scheduled to be delivered to the Test Area this week; however, the control console will not be available for test until 10/16. If Boeing delivers on time, and it is not necessary to cannibalize this arm to support 503, we should have no problem completing the test on schedule. ✓

S-II "A" STRUCTURE TEST Inspection of the S-II Structural Stage after Test Phase VIB revealed no major structural damage. Cracks of the baffles of the S-IC portion of the stage occurred again, but no repairs will be required. The cracks will be "stop-drilled". ✓

F-1 ENGINE Tests FW-103 and FW-104 will be made today on the West Area F-1 Test Stand. Primary purposes of these tests will be to investigate fuel suction duct pressure oscillations utilizing an upstream pulser, and to obtain test data to verify the F-1 engine fuel system transfer functions for POGO analysis. ✓

S-IVB (MSFC) Test S-IVB-066 was conducted on September 25, 1968, at the S-IVB (Battleship) Test Stand. The test was planned for a duration of 400 seconds; however, a minor fire occurred in the vicinity of the main fuel valve, which necessitated termination of the test at 28 seconds after ignition. No engine damage occurred. Cause of fire is still under investigation. ✓

MOBILITY TEST ARTICLES Initial road tests were conducted on the Bendix vehicle. Both vehicles were sent to Building 4619 for the open house display. ✓

MODERATE DEPTH LUNAR DRILL The Industrial Hygiene Group conducted an inspection as requested during your visit to this facility. They reported, on the basis of air sample analysis that no problem exists with this operation. ✓



1. THIRD GENERATION STATUS: The Computation Laboratory is currently running under Level 25 of the Executive System. Level 37 has been sidelined for testing and verification, and as soon as that is completed will be placed on the floor. When that occurs, the testing and verification period will end and system time will be used only for diagnostics, confidence testing, and programmer aid. Conversion can proceed at that time. Phase I remotes, except demand terminals, will be active. ✓

2. DELIVERY OF MARSYAS LANGUAGE REPORT: The final report, which contains the specifications and description of the language for the Marshall System for Aerospace Systems Simulation (MARSYAS), has been delivered by the contractor, Computer Applications, Inc. This language is of modular structure so that it can be easily expanded and is oriented towards use by an engineer rather than a programmer. It will allow the engineer to communicate directly with the computer in his technical terminology rather than in programming language.

MARSYAS is a program system for the simulation of large physical systems on the UNIVAC 1108 computer and is being developed in cooperation with Quality and Reliability Assurance Laboratory. This software system will make the costly mathematical models of any physical system widely available by using a central data bank and remote stations, so that the simulation can serve design engineers for analysis, checkout engineers for design evaluation and test engineers for fast failure analysis. ✓

3. ASTRONAUTS' VISIT: During the ATM Project Design Review held September 24 - 26, 1968, the ATM Mockup and the Control and Display Panels in the Simulation Branch were used. Three astronauts - Edward Gibson, Owen Garriott, and Paul Weitz - went through the operating procedures for startup and shutdown of the control system and most of the experiments. ✓

4. REQUEST FOR REPRINT OF PAPER: A request for a reprint of an article entitled "On-Line Systems and Man-Computer Graphics" published in the April 1967 issue of Astronautics and Aeronautics Magazine has been received from Dr. A. Lvov, Director of the Institute of Applied Mathematics, Siberian Division of the Soviet Academy of Sciences, Novosibirsk, U.S.S.R. This article was co-authored by S. H. Chasen, Lockheed-Marietta, and R. N. Seitz, Computation Laboratory. A copy of the article has been sent to Public Affairs Office for approval and transmittal to Dr. Lvov. ✓

B 10-1

1. AS-503 Roll-out: AS-503 roll-out, scheduled October 8 and assessed as October 12, will not conflict with AS-205 launch and will proceed independent of AS-205 activities.
2. S-II-6 Static Firing: The static firing of S-II-6 has been rescheduled from October 1, 1968, to October 4, 1968, to permit removal of the LOX sump baffles in order to verify the S-II-3 configuration by the firing. ✓
3. LH<sub>2</sub> Tank Pressure Abort Cue (low NPSH): MSC informed us at the Crew Safety Panel Meeting on September 25, 1968, that George Low, with the concurrence of D. Slayton and C. Kraft, decided not to use the LH<sub>2</sub> tank pressure measurement as an abort cue for AS-205. MSFC did not agree with this for either the AS-205 or the AS-503 mission. MSC has not stated their position on AS-503, but is sending out a TWX stating their rationale for this decision on AS-205. We will follow-up in conjunction with Dr. Speer's office.
4. IU Structural Insulation: On September 27, 1968, P&VE proposed to insulate the IU and remove the channels on its outside for AS-505 and subsequent. Insulating the IU would give a safety factor of 1.36 and replacing the channels with X-306 damping compound would bring the safety factor to 1.60. This requires elimination of planned IU heating during the tests at Wyle scheduled for this week. Some technical problems, e.g. cork or spray-on insulation, and schedule impact are expected to be resolved this week. No changes are anticipated for IU-503 and IU-504. ✓
5. MSFC In-flight Support for C' Mission: We have been informally approached by MSC on possible MSFC support in evaluating orbital insertion and coast conditions and giving a go - no go decision for Spacecraft TLI for the C' Mission. Such support would involve computer and manpower resources beyond anything we have done or planned in support of flight operations. To assure that we do not divert resources already strained to the limit, Fred Speer will chair a group composed of representatives from R&DO and my office to determine the support that MSFC could commit to MSC without jeopardizing the on-going program. We will report to the MSFC Board Meeting on October 11, 1968. ✓

LBJ

My understanding was that MSC

rejected the spacecraft

tank pressure

gauge as

a reliable

cue, and

preferred

to depend

on telemeter

link and

abort request

from the

ground. Is

that

no

longer

correct?

B

Harry Gorman

This (maybe very good)

plan would further aggravate our Comp Lab

problem B 10-1



NOTES 9/30/68 JOHNSON

B<sub>10-1</sub>

*OK. B.J. 10/14*  
*B.J. (+ Bonnie)*  
*I do plan to attend this*  
OMSF Supporting Development Quarterly Review - Ref your comment to this item reported in my Notes of 9/16, copy attached.\* The review is scheduled for October 23 in Houston. Date and location are now firm. Mr. Rees may and should attend if his schedule permits. However, in view of nature of the meeting and with Drs. Mueller, Debus, Gilruth and Messrs. Mathews, Donlan and Lord planning to attend, I believe it is important that you attend if at all possible. Attached\* for your information is a draft of a letter being prepared for your signature which will give you additional details on this subject. *Bonnie* *I like the letter. Please retype it for my signature*

OSSA Senior Council Meeting - Ref your comment to this item reported in my Notes of 9/23, copy attached.\* Specific actions for our "marketing" people are dependent on the Center's intentions and willingness to commit resources in competing for and performing OSSA planned work. The October 2 Future Planning Policy Board Meeting addresses this point. If OSSA work is included in the determinations of the FPPB, the nature and scope of areas of opportunity (e.g., communication systems for the Earth Resources Program) must be carefully investigated to assure compatibility between size of the job and resources available to accomplish the job. With these steps being taken, the "marketing" people will have the ammunition needed to present a strong case for the Center in the areas selected. *URGENT B<sub>10-1</sub>*

Research Achievements Review (RAR) - The fourth RAR of the third series was held Thursday, September 26, in the Morris Auditorium. Sponsored by the Aero-Astrodynamic Laboratory, the presentations dealt with the areas of Aerophysics Research. Mr. W. K. Dahm, Chief of the Aerophysics Division, organized the review and introduced the subject areas and the speakers. While attendance was somewhat below normal, (130 were present), there was a good representation of MSFC, contractor, and Department of Defense personnel. Of the eleven DOD attendees, five were from the Arnold Engineering Development Center.

\*Copies provided DIR and R-DIR only.

NOTES 9-30-68 KUERS

B  
12-1

No significant items to report.



B10-1

1. AAP MECHANICAL PANEL: The sixth AAP Mechanical Panel meeting was held 9-26-68 at MSFC. The main activity was baselining ICD's. All AAP-2 ICD's will be forwarded to the Panel for baselining by the first week of December 1968. All AAP-4 ICD's will be forwarded to the Panel for baselining by the first week of February 1969. All AAP Experiment ICD's will be forwarded to the Panel at two week intervals beginning with T027 on 10-15-68, with completion by 2-1-69. Revisions to Apollo ICD's will be submitted by first week of December 1968 to include AAP-1, 3, 3A missions. ✓
2. S-II BASE HEATING: S-II-6 engines are misaligned to such an extent that we question the capability of the heat shield under these conditions. The engines on S-II-3 are out-of-specification in alignment but are not to the extent to cause alarm. S-II-5 and S-II-7 are within specification but were measured by a different system. Thus, the true location of the S-II-6 engines is questionable, and R-QUAL Lab has been asked to follow up and develop an engine alignment procedure.
3. POGO: To provide added confidence in the recently revised fuel feedline frequency data, which were based on four static firing results, we have scheduled four more fuel pulsing tests, beginning 9-30-68. These tests will also have improved chamber pressure and pump discharge pressure dynamic measurements which are required to verify the F-1 engine fuel transfer function. In addition, baseline fuel pulsing tests on the inboard and outboard fuel feedline configurations will be run on the F-1 turbopump test stand on 9-30-68 and 10-2-68 respectively. The objective of these tests is to evaluate possible inboard and outboard fuel PVC compliance differences which could result in different resonant frequencies for the two configurations. ✓
4. S-IC STRESS CORROSION FAILURE: A 7079-T6 die forging, used as a cruciform baffle support, was found cracked in the S-IC-507 LOX tank. This part has high residual stresses and up to 28 ksi assembly stress in the long transverse grain direction. This item was identified by TBC as a Category 2 item on the stress corrosion survey which means "failure of this part, due to stress corrosion, compromises mission accomplishment." TBC proposed to defer corrective measures on 132 Category 2 items until after 61 Category 1 items were corrected.
5. S-IC CORROSION: Excessive corrosion has been found on the S-IC-512 LOX tunnels subsequent to hydrostatic test. Corrosion, attributed to inadequate anodize treatment, has also been found on those LOX tunnels in storage. Personnel at Michoud report that there have been no changes in the anodize treatment.
6. LM/ATM PDR CONTROL & DISPLAY PANEL STATIC SIMULATOR REVIEW: As part of the LM/ATM PDR Crew Station Working Group on 9-25-68 and 9-26-68, MSC astronauts participated in a crew evaluation of the control and display panel systems operations and integrated experiment operations. Each astronaut (Garriott, Gibson, Weitz, and McCandless) spent 4 hours in the static control and display panel simulator at R-COMP Lab going through the procedures generated by our Human Factors people. The astronauts requested an additional 2 days to continue this work now tentatively scheduled for 10-14-68 and 10-15-68.

Dieter  
Grazu  
How is  
that  
possible?  
B

→  
I.O.  
(Sat V)  
Manager  
Please  
comment  
B

B.L.  
Did we  
buy this  
or did  
we reject  
B

Supp Let's visit this place  
B

B<sub>10</sub>-1

NASA APPROPRIATION BILL: The Senate has passed a NASA appropriation bill recommended by the Senate/House Conference Committee at \$3,995,273,000. This provided for the Agency

|     |                 |
|-----|-----------------|
| R&D | \$3,370,300,000 |
| CoF | 21,800,000      |
| AO  | 603,173,000     |

H.M.

In case this goes thru, is there a plan how the \$145M will be distributed  
B

This is \$12,727,000 below a previous separately approved House and Senate appropriation of \$4,008,000,000. It is however \$145,273,000 above Mr. Webb's proposed agency interim FY-69 operating plan of \$3,850,000,000 which was designed to absorb part of the required cuts under the program of reduced federal expenditure. The Conference Committee bill now requires final action by the House as part of the Independent Offices and Department of Housing and Urban Development Appropriation Bill. ✓

RUSH

MSFC SUPPORTING DEVELOPMENT PROGRAM: A memo from Dr. Mueller dated September 17 has directed the Center to eliminate all FY-69 Supporting Development work on Apollo and Apollo Applications except J-2S and other tasks of an urgent or critical nature. This is in compliance with the Deputy Administrators direction to concentrate Supporting Development funds on Advanced Missions, i.e., Future Lunar Exploration and Large Space Stations. We are required to review our Supporting Development programs and submit a revised program based on these guidelines.

In support to this, we have received a memorandum from Jerry Kubat revising our POP 68-2 Supporting Development guidelines as shown below:

|                               | FY-69     |           | FY-70     |         |
|-------------------------------|-----------|-----------|-----------|---------|
|                               | Previous* | Revised   | Previous* | Revised |
| Apollo Supporting Development |           | 3M (J-2S) |           | 0       |
| AAP Supporting Development    |           | 0         |           | 0       |
| Advanced Manned Missions      |           | 3M        |           | 7M      |
| Supporting Development        |           |           |           |         |
| Total                         | 6M        | 6M        | 12M       | 7M      |

\*No Directions previously given on utilization of Sup. Dev. funds.

At this time, there is no indication where J-2S will be funded in FY-70.

Shes  
What's  
the object  
five of  
the meeting  
at MSC  
on 23  
Oct in  
view of  
this.  
See Johnson  
NOTES 9/30  
and my  
proposed  
letter  
attached  
to these  
NOTES  
B



On Thursday, September 24, in response to an invitation, Athens College was visited. General discussion disclosed an interest in providing graduate work opportunities for MSFC employees. With some modification to existing graduate course structure, an offering in Management could be provided. The matter will be explored to determine whether or not there is sufficient interest at MSFC.

The UAH autonomy briefing was presented to Dr. David Mathews and University of Alabama Department Heads on September 25. This was extremely well received. In turn, a financially oriented briefing was provided by the Comptroller which lent considerable strength to the MSFC positions. Briefly, UAH not only receives every cent appropriated for it, but, in addition, benefits from services furnished by the Tuscaloosa Campus for which no charges are made. General Fidler will be so apprised. This entire subject may, in my opinion, now be set aside for the time being. ✓

Representatives of LSU and MSU will meet individually at MSFC on October 1 and 2 to explore in detail projects for MSFC to be pursued at MTF. ✓

B<sub>10</sub>-1

Lewis Hydrogen Safety Manual:

Lewis Research Center provided us a copy of the Lewis Hydrogen Safety Manual for our review. The intent of this Manual was to provide a standard for general applicability across NASA. Our laboratories reviewed the Manual thoroughly and found that it should not be adopted as a standard because it would totally restrict operations which we have at MSFC and at our MSFC contractors.

We have responded to Lewis indicating our non-acceptance of their Manual. Additionally, we have sent copies to Mr. Helgeson (NASA Headquarters) and Mr. Lederer (MSF) to insure that this document is not processed further as a NASA standard, or that it is changed to meet our MSFC requirements. ✓

J. M.

Please see to it that Dr. Debus  
gets a copy so he can  
also dig in. B



P. U. System Utilization Decisions: We have recommended to Lee James that AS-504 be flown with the same mixture ratio profile as previously planned for the "D" mission. This would mean closed loop on the S-II burn and 5.5 MR on the S-IVB into orbit. The 2nd and 3rd burns out of orbit would be open loop as previously planned. This plan will allow us to use as much of our previous "D" mission work as possible.

Because of our margins on future flights and because we have other methods of increasing payload capability in work we are recommending that vehicles AS-505 and subsequent be flown with the P. U. system in the "open loop" mode. We feel this is an overall system simplification, particularly when we take into account all of the effort involved in flight preparation and predictions, let alone the fact that less hardware has to work during the flight.

Cur P. U. concept has to be proven and AS-504 will give us added experience.

Quality efforts must be continued on the system since it is utilized to load the vehicle and since a part of it (the valve command system) must work in flight. ✓

NOTES 9/30/68 SPEER

B<sub>10-1</sub>

1. AS-205 Flight Readiness Test: The launch vehicle portion of the AS-205 Flight Readiness Test (FRT) was completed 1820 CDT (T+3 hours & 45 minutes) on September 27. There were two non-scheduled holds totaling 5 hours and 21 minutes which were caused by KSC procedural error and spacecraft GSE power supply problems. During the plus count the J-2 helium regulator failed. ✓
2. Apollo Aircraft Support Planning: We participated in a meeting of the Network Operations Group concerned with the operation of the Apollo Range Instrumentation Aircraft (ARIA) in support of Apollo Missions C and C'. ARIA will support the launch vehicle on Mission C at the time of the manual crew control exercise. For Mission C' ARIA will provide the sole data retrieval media during the S-IVB second burn (ground stations and ships provide very limited coverage). These have, of course, always been our plans for the lunar mission. However, in this phase of our program, data requirements (pre-ignition sequencing and second burn) are in excess of the ability of the ARIA fleet which is still in a modification/developmental/testing phase. Definite tradeoffs in data quality and duration of coverage must be made. We are working on a priority basis (with R&DO) to establish a support specification for the second burn phase of Mission C' which will in turn be used to define the ARIA flight plan. ✓
3. DOD Support Requirements and Reimbursement Policies: NASA costs for support requirements levied on DOD are increasing, primarily because of recent BOB determinations (60% DOD and 40% NASA cost sharing) concerning AFETR FY69 budget and DOD direction to place ETR on a full-cost task order basis as soon as possible. The ETR support cost for FY69 is \$51.4 M, but this figure could increase significantly for subsequent years, since ETR is planning to convert to industrial funding by July 1, 1969, and NASA is the big user of the Range. Gen. Stevenson held a meeting on this subject at MSC on 9/24 and emphasized the necessity of a detailed review of the NASA required DOD support in terms of its real need and determining if NASA has capability to furnish support in lieu of DOD. This office will be working closely with Headquarters and MSFC elements on the review and actions involving MSFC mission support requirements levied on DOD. ✓

1. APOLLO SITE SELECTION BOARD MEETING: This meeting, chaired by Lt. Gen. Phillips, took place in Washington on 9/26. Conclusions and decisions included the following: (1) Software for four landing sites will be prepared for the first landing. (2) Options for even more potential landing sites for the second and third landings will be established. (3) Additional landing sites for the second and third landings should be chosen according to their scientific interest. (4) Each of the four landing sites presently considered for the first landing may be moved by a few kilometers in order to make it more rewarding from a science standpoint, pending further operational studies. (5) A number of new sites as far as  $40^{\circ}$  north and south of the equator will be studied now as possible landing sites after the first three Apollo landings. (6) A new descent guidance scheme for the lunar landing which is less sensitive to ground elevations, described by Jack Sevier (MSC), is being considered as a possible LM descent guidance system. A more detailed trip report will be distributed soon.
2. VISIT BY SCIENTIFIC CONSULTANT: Dr. O'Dell, Director of Yerkes Observatory, spent a day (9/27) at MSFC, first in the neutral buoyancy tank (unfortunately, Dr. O'Dell burst an ear drum at 40 feet depth, but there seems to be a good chance that it will heal again), and then with AERO (Dr. Krause), P&VE (Mr. Kingsbury), ASTR (Dr. Haeussermann and staff), and SSL (me and my staff). Dr. O'Dell spent several hours in the evening discussing his impressions, and the development of space astronomy as anticipated by astronomers. I will write a more detailed report covering these talks.
3. VISIT BY DR. K. O. KIEPENHEUER: Dr. Kiepenheuer, astronomer and Director of the Fraunhofer Institute in Freiburg (author of the book "The Sun"), visited MSFC on 9/26 as a guest of Dr. Haeussermann who had brought him from Palestine, Texas, where he is preparing a balloon flight of a 30 cm, 60 m focal length solar telescope. Dr. Kiepenheuer seemed to be greatly impressed by all he saw at MSFC. He encouraged SSL to pursue the magnetoheliograph project as vigorously as possible because it will enable us "to make a first class contribution to contemporary solar astronomy."
4. THERMAL CONTROL STUDY: A paper "Space Simulation for Thermal Control Surfaces Research," by Ed Miller, Don Wilkes, and Jim Zwiener is to be presented at the ASTM meeting in Atlanta next Friday, October 4. The paper discusses a possible explanation for the apparent difference between the degradation of thermal control surfaces experienced in low earth orbit and the degradation found at higher altitudes and on lunar and planetary satellites. This involves the atomic oxygen available at the lower altitudes which partially counteracts the degradation by UV "bleaching." Previously, this difference in degradation has been attributed only to solar wind damage.
5. VISIT FROM JAPAN: Dr. Oshima of the University of Tokyo, Japan visited SSL-T on 9/23. We showed him our laboratories and discussed some areas of mutual interest. Dr. Oshima is in charge of the thermal design of the first Japanese satellites.



NOTES 9/30/68 TEIR

B-1

AS-205 FLIGHT READINESS TEST: The AS-205 FRT was completed Friday night with relatively few problems and only one serious problem. The only hold due to the launch vehicle was caused by an S-IVB J-2 engine cutoff at 3 seconds after ignition. This was determined to be caused by the fact that power to the 6D119 facility bus had been switched off because of an error in writing procedures. The FRT procedures should have differed from CDDT and launch procedures. In the FRT this bus is required for some of the J-2 engine simulations. After this hold, the test was re-run from T-28 through T+4 hours and 30 minutes. During the S-IVB burn the pressure dropped off rapidly in the J-2 engine pneumatic control system. The accumulator retained enough volume to close the valves and give engine shutdown at the proper time, as it is designed to do. At the end of the test it was determined that a regulator diaphragm failure would require changeout of the pneumatic control module. This changeout has been accomplished over the weekend and we completed test and checkout of the system this morning (Monday). Rocketdyne is running the failure analysis on this module and we have requested expedited action from the Engine Office. This problem has not caused a launch schedule slip and we know of no other problems at this time that should slip the October 11 launch schedule. ✓

AS-205 FLIGHT READINESS REVIEW (FRR): The AS-205 FRR is scheduled for 8:00 AM, Thursday, October 3, 1968, in the MSOB Conference Room at KSC. I am sending you a memorandum today covering two items which will probably be discussed at the FRR. ✓



B10-1

1. Integral Launch and Reentry Vehicle - As announced last week, the Integral Launch and Reentry Vehicle Study (Stage and One-half) was disapproved by Harold Finger. On 9/25, Doug Lord talked to Dr. Mueller, Dr. Newell, Wyatt, Fleming, Ray Kline, and Donlan to see if pressure could be brought to get these studies approved. In addition, Dr. Mueller talked to Finger. Dr. Mueller continues to remain serious on the subject of low-cost orbital logistics, particularly the stage and one-half to orbit and return (see attached letter). Donlan requested that Hal Becker participate with him in determining his response to Dr. Mueller on this subject. Hal will be sitting with Lord, MSC, LaRC, and Bellcomm on 10/1/68 in Washington. We will keep you informed as this evolves and insure proper Center participation. ✓

2. Earth Orbital Space Lab (EOSL) - Hal Becker took several ASO and co-located people for two days of discussion in Washington with personnel in the Advanced Manned Missions Program Office (MT). The MT people gave us a "hot off the press" copy of their project plan for EOSL especially for our comments. The plan reflects Mathews' direction (see enclosed letter by Headquarters documenting meeting on 9/23 with Mathews on this area). The document includes a projected study plan, management arrangements, Center assignments, and contracting procedures. There are still some significant questions about this approach that need further consideration. Perhaps the most significant is the plan for competitive phase "B" studies by MSC and MSFC. This type of competition may bring a healthy best product as desired, or may develop deep differences that could be difficult to reconcile - once studies are completed and we try to push forward as a NASA team. There are other approaches to the problem, but they may require a functional division of Center responsibilities at this time; perhaps before we clearly understand implications of some of the elements of the job. Hal Becker, Jim Madewell, and George von Tiesenhausen discussed these potential concerns at length with Mathews. He agreed they were real, but felt the approach as defined in the project plan is the only reasonable path. He would be receptive to alternative approaches that could preclude future competitive problems if they are sufficiently realistic. We told Mathews that we would tell you and Mr. Weidner of our discussion with him and recommended he visit and discuss his thoughts and plans with you now that the program appears to be shaping up as a real activity and definitive plans are being established. He was extremely receptive to a visit of this nature which we said we would arrange after speaking with you and Mr. Weidner. We would like to do this at your earliest convenience. *Place arrange through Bonnie* *3 noted 10/4*

As a part of EOSL discussions on 9/25, plans were discussed for studies of launch vehicle and logistic system options. Mathews has required that the whole picture of logistics be reviewed with him before finalizing this part of the Phase B plan. A major item of debate is continued use of the CSM vs. a new logistics spacecraft. MT people plan to consider existing launch vehicles only in Phase B. We feel that this point needs further discussion and will pursue it, and expect to be asked to participate in preparation for the review of logistics options. ✓

2 Enc. (DIR and R-DIR copies only)

*Dr von Braun withdrew the Enc 2 for further study* *10/4*